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EARNINGS MOBILITY IN THE EU: 1994-2001[*]

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November 2010

Abstract

Using a consistent comparative dataset for 14 EU countries, we explore the earnings mobility-inequality linkage in the EU over the period 1994-2001 on two axes: first the evolution of short-term mobility and its link with cross-sectional inequality; second, the evolution of long-term mobility relative to short-term mobility and the implications for lifetime or long-term inequality. We use two types of mobility measures: (i) a rank measure derived from the changes in the individual ranks in the earnings distribution; (ii) a recent measure of mobility as an equalizer of longer-term incomes, complementary to the well-known Shorrocks index. We find evidence supporting a negative association between the evolution of cross-sectional inequality and short-term rank mobility across the EU. Long-term, Denmark appears to have the most mobile earnings distribution with the second highest equalizing effect in the EU. The only disequalizing mobility in a lifetime perspective is found in Portugal. Besides making a substantive contribution to the literature on cross-national comparisons of earnings mobility at the EU level, our paper brings evidence to the debate regarding the ability of the Shorrocks index in capturing the true equalizing/disequalizing effect of mobility.

JEL Classification: C23, D31, J31, J60
Keywords: panel data, wage distribution, inequality, mobility

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1. Introduction

Interest in the extent of mobility in individual earnings over time has increased in recent years and was fuelled by the rise in earnings inequality experienced by many developed countries during the 1980s and 1990s, which triggered a strong debate with respect to the driving factors and the implications of this increase. Some analysts argue that rising annual inequality does not necessarily have negative implications. This statement relies on the "offsetting mobility" argument, which states that if there has been a sufficiently large simultaneous increase in mobility, the inequality of income measured over a longer period of time, such as lifetime income or "permanent" income - can be lower despite the rise in annual inequality, with a positive impact on social welfare. This statement, however, holds only under the assumption that individuals are not averse to income variability, future risk or multi-period inequality (Creedy and Wilhelm, 2002; Gottschalk and Spolaore, 2002). There is not a complete agreement in the literature on the value judgement of income mobility (Atkinson, Bourguignon, and Morrisson, 1992).

Those that value income mobility positively perceive it in two ways: as a goal in its own right or as an instrument to another end. The goal of having a mobile society is linked to the goal of securing equality of opportunity in the labour market and of having a more flexible and efficient economy (Friedman, 1962; Atkinson et al., 1992). The instrumental justification for mobility takes place in the context of achieving distributional equity: lifetime equity depends on the extent of movement up and down in the earnings distribution over the lifetime (Atkinson et al., 1992). In this line of thought, Friedman (1962) underlined the role of social mobility in reducing lifetime earnings differentials between individuals, by allowing them to change their position in the income distribution over time. Thus earnings mobility is perceived in the literature as a way out of poverty. In the absence of mobility the same individuals remain stuck at the bottom of the earnings distribution, hence annual earnings differentials are transformed into lifetime differentials. All in all, mobility is seen as a bridge between short and lifetime earnings differentials: a cross-sectional snapshot of income distribution overstates lifetime inequality to a degree that depends on the degree of earnings mobility. If countries have different earnings mobility levels, then single-year inequality country rankings may lead to a misleading picture of long-term inequality ranking. Simple inferences about lifetime income distributions cannot be made on the basis of cross-sectional distributions alone, thus the need for information on earnings mobility.

In order to understand the evolution of economic inequality and opportunity across countries, and the implications for lifetime inequality, it is crucial to complement the analysis of cross-sectional inequality with the analysis of longer-term inequality and the analysis of earnings mobility. As previous studies demonstrated, attaining comparability across countries in a single year is a demanding task. Doing so for

multi-year studies has rarely been attempted.[1] Using a consistent comparative dataset for 14 EU countries – the European Community Household Panel (ECHP) – the present study explores the following questions:

(i) What is the country ranking with respect to earnings inequality and how does the ranking change with the horizon over which inequality is measured?

(ii) Did short-term mobility increase over time across the EU and what are the links with the evolution of cross-sectional earnings inequality?

(iii) Did short-term mobility become more or less equalizing over time and how does it differ across the EU?

(iv) Is there any earnings mobility in a long-term perspective, meaning are the relative income positions observed on an annual basis shuffled long-term, and how does it differ across the EU?

(v) To what extent does earnings mobility work to equalize/disequalize longer-term earnings relative to cross-sectional inequality and how does it differ across the EU?

(vi) What is the ordering of countries with respect to the mobility of earnings and what are the implications for the country ranking in lifetime earnings inequality?

The cross-national comparative perspective at the EU level is motivated primarily by the heterogeneity across the EU: countries with different systems are expected to trigger different distributional outcomes, both in an annual and a lifetime perspective. The economic reality of the 1990s in Europe, when the single market was implemented (1992) and the single currency was being prepared (Maastricht criteria adopted in 1993), increased the pressure on the European labour markets to change. Since the early 1990s influenced by the 1994 OECD Job Strategy, Europe has been moving towards more flexible labour markets, from labour shedding to employment-friendly reforms, expected to worsen the trade-off between a strong employment performance and a more equal distribution of earnings (OECD, 2004). But the pace of change was different across Europe (Palier, 2010) supporting the expectation of increased country-heterogeneity with respect to the labour market structure and the distribution of labour market income across the EU, both in an annual and a lifetime perspective.

We use two types of mobility measures: (i) a rank measure derived from the changes in the individual ranks in the earnings distribution Dickens (1999); (ii) a new measure of mobility as an equalizer of longer-term incomes - developed by Fields (2008) – complementary to the well-known Shorrocks (1978) index.

The contribution of our study to the existing literature is threefold.

First, at the EU level, no study has attempted to explore and to understand in a consistent comparative fashion the different facets of earnings mobility-inequality story over a more recent period and covering a

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[1] We review below the existing cross-national longitudinal income distribution comparative studies.

longer time frame than six years. The number of consistent comparative studies on earnings mobility is limited because of the lack of sufficiently comparable panel cross-country data. Moreover, most of the existing studies focus on the comparison between the US and a small number of European countries. Aaberge, Bjorklund, Jantti, Palme, Pedersen, Smith, and Wannemo (2002) compared income (family income, disposable income and earnings) inequality and mobility in the Scandinavian countries and the US during 1980-1990. Brukhauser and Poupore (1997) and Brukhauser, Holtz-Eakin, and Rhody (1998) compared earnings or disposable income mobility and inequality between Germany and the US between 1983 and 1988. Fritzell (1990) studied mobility in Sweden between 1973 and 1980, and compared the results with Duncan and Morgan (1981) for the US between 1971 and 1978. The OECD (1996, 1997) presented a variety of comparisons of earnings inequality and mobility across OECD countries over the period 1986-1991. Hofer and Weber (2002) looked at mobility in Austria between 1986-1991 and compared their results with the OECD (1996, 1997) results for Denmark, Germany, Spain and the UK. The results vary depending on the definition and measure of mobility. Van Kerm (2004) looked at income mobility in Belgium, Western Germany and the USA between 1985 and 1997. Most recently, Fields (2008) looked at the US and France between the 1960s and the 1990s. However, no consistent comparative study at the EU level. By exploiting the eight years of the ECHP, our paper aims to fill part of this gap and to make a substantive contribution to the literature on cross-national comparisons of earnings mobility at the EU level.

Second, we bring additional evidence supporting the debate regarding the limitations of the Shorrocks index in capturing the equalizing/disequalizing effect of mobility (Benabou and Ok ,2001; Fields, 2008), and we argue for the need to complement the evidence brought by the Shorrocks index with an alternative measure developed by Fields (2008). The Fields (2008) index, which has not been applied in any comparative study in Europe so far, is able to circumvent the limitations of the Shorrocks index, and thus bring complementary information that could be used for making inferences about lifetime income distributions.

Third, unlike previous studies that rely on a fully balanced sample to explore mobility as an equalizer of longer-term incomes (only those individuals that record positive earnings independent of the sub-period), we use an unbalanced sample over different sub-periods. Thus we explore mobility as an equalizer of longer term incomes not only for those employed over the entire sample period, but also for those that move into and out of employment. Focusing only on the fully balanced sample may bias the estimation of mobility due to the overestimation of earnings persistency. Moreover, besides the employment status, there are other factors determining panel attrition. All in all, this exercise provides an interesting check of the impact of differential attrition on the study of earnings mobility as an equalizer of longer term differentials using the Shorrock and the Fields index.

2. Data

The study uses the European Community Household Panel (ECHP)[2] over the period 1994-2001 for 14 EU countries. Not all countries are present for all waves. Luxembourg and Austria are observed over a period of 7 waves (1995-2001) and Finland over a period of 6 waves (1996-2001). Following the tradition of previous studies, the analysis focuses only on men.

A special problem with panel data is that of attrition over time, as individuals are lost at successive dates causing the panel to decline in size and raising the problem of representativeness. Several papers analysed the extent and the determinants of panel attrition in ECHP. Behr, Bellgardt, Rendtel (2005) found that the extent and the determinants of panel attrition vary between countries and across waves within one country, but these differences do not bias the analysis of income or the ranking of the national results. Ayala, Navrro, Sastre (2006) assessed the effects of panel attrition on income mobility comparisons for some EU countries from ECHP. The results show that ECHP attrition is characterized by a certain degree of selectivity, but only affecting some variables and some countries. Moreover, the income mobility indicators show certain sensitivity to the weighting system. The weighting system applied here to correct for the attrition bias is the one recommended by Eurostat, namely using the "base weights" of the last wave observed for each individual, bounded between 0.25 and 10. The dataset is scaled up to a multiplicative constant[3] of the base weights of the last year observed for each individual.

For this study we use real net[4] hourly wage adjusted for CPI of male workers aged 20 to 57, born between 1940 and 1981. Only observations with hourly wage lower than 50 Euros and higher than 1 Euro were considered in the analysis. The resulting sample for each country is an unbalanced panel. Details on the number of observations, inflows and outflows of the sample by cohort over time for each country are provided in Table 1. For more details on the inflows/outflows in the sample, see Sologon (2009, 2010).

3. Methodology

In this study we explore the different facets of the inequality-mobility relationship at the EU-level using three mobility measures introduced over time as improved alternatives (For a review of the methodology used for measuring mobility, please refer to Fields and Ok, 1999; Fields, Leary, and Ok, 2003). When exploring mobility, we have in mind Friedman's (1978) arguments in favour of earnings mobility: it contributes to social mobility and equality of opportunity, and it reduces lifetime earnings

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[2] The European Community Household Panel provided by Eurostat via the Department of Applied Economics at the Université Libre de Bruxelles.

[3] The multiplicative constant equals p*(Population above 16/Sample Population). The ratio p varies across countries so that sensible samples are obtained. It ranges between 0.001-0.01.

[4] For France the wage is in gross amounts.

differentials relative to annual ones. Thus we have in mind two aspects of mobility: mobility as opportunity, and mobility as equalizer of longer-term differentials.

Mobility as opportunity to change positions in the earnings distributions between years

The opportunity to move in the earnings distribution between periods is best reflected by rank measures, which capture positional movements in the distribution of earnings. Traditional rank measures are derived from the transition matrix approach between income groups. This approach to mobility, however, fails to capture the movement within each income group, running the risk of underestimating the degree of mobility. An alternative approach, used in Dickens (1999), is to compute the ranking of the individuals in the wage distribution for each year and examine the degree of movement in percentile ranking from one year to the other. For each mobility comparison only individuals with positive earnings in both periods are considered. The measure of mobility between year *t* and year *s* is:

$$M_{ts} = 2 * \sum_{i=1}^{N} |F^t(w_{it}) - F^s(w_{is})|/N \tag{1}$$

where $F(w_{it})$ and $F(w_{is})$ are the cumulative distribution function for earnings in year *t* and year *s* and *N* the number of individuals with positive earnings in both years. Based on this measure, the degree of mobility equals twice the average absolute change in percentile ranking between year *t* and year *s*. When there is no mobility *M* equals *0* - people maintain their earnings position from year *t* to *s* - the difference between $F^t(w_{it})$ and $F^s(w_{is})$ equals 0 for all individuals. M equals maximum 1 if earnings in the two years are perfectly negatively rank correlated - in the second period there is a complete reversal of ranks -, and the value 2/3 if earnings in the two periods are independent. The robustness of this measure of mobility was discussed in Dickens (1999).

We estimate two types of mobility measures:

(i) short-term mobility or 2-year period mobility *M(t, t+1)* - defined as mobility between periods one year apart, between year *t* and year *t+1*, used to assess the pattern of short-term mobility (in terms of opportunity to move) over time and its link with the evolution of cross-sectional inequality;

(ii) long-term mobility or 8-year period mobility *M(t, t+7)* - defined as mobility between periods seven years apart, between year *t* and year *t+7*, used to assess the extent to which mobility increases with the time span.[5]

This measure – referred to as "the Dickens index" in the rest of the paper - however, fails to formalize the relationship between earnings mobility and earnings inequality, limitation corrected by Shorrocks (1978), as explained in the next subsection.

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[5] For Luxembourg and Austria the sample span is of 7 years, and in Finland of 6.

Mobility - as opportunity to change positions in the distribution of long-term earnings relative to single-year earnings

Shorrocks (1978) introduced a family of mobility measures that incorporates a close relationship between income mobility and income inequality. Mobility is measured as the relative reduction in the weighted average of single-year inequality when the accounting period is extended: [6]

$$0 \leq R_T = I(\sum_{t=1}^{T} y_{it}) / \sum_{t=1}^{T} w_t I(y_{it}) \leq 1 \tag{2}.$$

y_{it} represents individual annual earnings, t time $t = 1, ..., T$, I is an inequality index that is a strictly convex function of incomes relative to the mean, $I(\sum_{t=1}^{T} y_{it})$ the inequality of lifetime income, w_t the share of earnings in year t of the total earnings over a T year period and $I(y_{it})$ the cross-sectional annual inequality. R_T ranges from *0* (perfect mobility) to *1* (complete rigidity).[7] There is complete income rigidity if lifetime inequality is equal to the weighted sum of individual period income inequalities, meaning that everybody holds their position in the income distribution from period to period. Perfect mobility is achieved when everybody has the same average lifetime income, meaning that there is a complete reversal of positions in the income distribution. The degree of mobility is computed as $M_T = 1 - R_T$. Shorrocks (1978)'s mobility definition is important from an economic point of view because it provides a way of identifying those countries that exhibit a high annual income inequality, but fares better when a longer period of time is considered. If a country A has both greater annual inequality and greater rigidity than country B, it will be more unequal than B whatever period is chosen for comparison. But if A exhibits more mobility, this may be sufficient to change the rankings when longer periods are considered (Shorrocks, 1978).

In the literature the Shorrocks index is usually classified among the measures of mobility as an equalizer of longer-term differentials. During recent years, however, the criticism that Shorrocks fails to capture the equalizing effect has been gaining momentum. Benabou and Ok (2001) and Fields (2008) highlighted the main limitation of the Shorrocks measure: it fails to quantify the direction and the extent of the difference between inequality of longer-term income and inequality of base year income, treating equalizing and disequalizing changes essentially in an identical fashion. Our study brings additional evidence for this criticism, and argues for the need to complement the evidence brought by the Shorrocks index with an alternative measure, able to capture the equalizing/disequalizing impact of mobility. Thus we opt for using the Shorrocks index as an overall measure of lifetime mobility – conceptualized as the opposite of earnings rigidity, which captures the opportunity to change positions in the distribution of long-term/lifetime earnings relative to the cross-sectional distribution.

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[6] The formula applies for a cohort of constant size.
[7] To compute this index only individuals that are present in all years are considered.

Mobility - as equalizer of longer term differentials - Fields Index (2008)[8]

Fields (2008) proposed an alternative index, which circumvents the limitation of the Shorrocks index, capturing mobility as an equalizer/disequalizer of longer-tern incomes:

$$\varepsilon = 1 - (I(a)/I(yl)) \tag{3},$$

where a a is the vector of average incomes, yl is the vector of base-year incomes, and I(.) is a Lorenz-consistent inequality measure such as the Gini coefficient or the Theil index. A positive/negative value of ε indicate that average incomes, a, are more/less equally distributed than the base-year incomes, yl, and a 0 value that a and yl are distributed equally unequally.For a complete description of the properties of the Fields index please refer to Fields (2008).

By applying the Shorrocks and the Fields indices, we first assess the degree of long-term earnings mobility across 14 EU countries, and second we establish whether this mobility is equalizing or disequalizing long-term earnings differentials. We choose to work with the mobility index based on the Theil index, as it is more sensitive to the tails of the distribution.

For each approach we estimate two types of mobility measures:

(i) short-term mobility or 2-year period mobility *M(t, t+1)* – which for Shorrocks measures the degree to which the relative earnings positions observed on an annual basis are shuffled in the distribution of 2-year earnings, and for Fields measures the extent to which mobility equalizes the inequality measured over a 2-year horizon relative to cross-sectional inequality in base year *t*;

(ii) long-term mobility or 8[9]-year period mobility *M(t, t+7)* – which for Shorrocks measures the degree to which the relative earnings positions observed on an annual basis are shuffled in the distribution of 8-year earnings, and for Fields measures the extent to which mobility equalizes the inequality measured over a 8-year horizon relative to cross-sectional inequality in base year *t*.

We distinguish between three types of inequality: cross-sectional inequality, short-term inequality – inequality in earnings measured over a 2-year horizon - and long-term inequality - inequality measured over the sample period horizon

Most studies analysing mobility as an equalizer of longer-term differentials rely on a fully balanced panel, meaning only individuals recording positive earnings over the entire sample. The main drawback of this approach is the exclusion of individuals with irregular profiles, thus running the risk of overestimating earnings persistency. Therefore, we opted for an "unbalanced" approach, meaning using

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[8] The concept of mobility as an equalizer of longer term income is an old one, complementing mobility-as-time-independence, positional movement, share movement, non-directional income movement, and directional income movement (Fields, 2008).

[9] 7 for Luxembourg and Austria, and 6 for Finland.

unbalanced panels across different sub-periods (e.g. the mobility index for 1994-1997 is based on individuals with positive earnings in each year between 1994 and 1997, and not only on individuals with positive earnings over the entire sample period 1994-2001, which would be the case under a fully "balanced" approach). To check, however for the impact of differentials attrition, we report both approaches.

4. Changes in earnings inequality

We start by describing the evolution of the hourly earnings distribution both over time and across different time horizons, the ordering of countries with respect to hourly earnings inequality and how this ordering changes when the accounting period is extended from one to several years. The purpose is to get a glimpse into the intra-country and inter-country changes in the distribution of hourly earnings, both over time and across different horizons.

Changes in cross-sectional distribution over time

We start with the changing shape of the cross-sectional distribution of earnings for men over time. On average, men got richer over time in most countries except Austria. Plotting the percentage change in mean hourly earnings between the beginning of the sample period and 2001 at each point of the distribution for each country (Figure 1), reveals a negative and nearly monotonic relationship between the quantile rank and the growth in real earnings in most countries: the higher the rank, the smaller the increase in earnings. Thus hourly earnings of low-paid people improved to a larger extent than those of the better-off. The steepest profile is identified in Ireland, suggesting that across Europe, relative to high wage individuals, the Irish low wage individuals improved their wage situation the most. In Austria, people at the top of the distribution experienced a decrease in mean hourly wage over time, which may explain the decrease in the overall mean. Finland, Germany, Greece, and Netherlands diverge from the other EU countries experiencing a higher relative increase in earnings the higher the rank. Only in the Netherlands, men at the bottom of the income distribution recorded a deterioration of their work pay.

The positive relationship between the quantile rank and the growth in real earnings may explain the increase in cross-sectional inequality found in the latter four countries, as captured by the Gini index, the Theil Index (GE(1)) and the Atkinson inequality index (aversion parameter=1) in Table 2[10]. Consistent across indices, cross-sectional inequality is found to increase also in Italy, Luxembourg and Portugal, despite the negative association between the quantile rank and the growth in real earnings. A decrease in cross-sectional inequality over time is found in the remaining countries.[11] These trends shuffled the

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[10] Inequality indices differ with respect to their sensitivity to income differences in different parts of the distribution, therefore they illustrate different sides of the earnings distribution.
[11] The trends for Denmark, UK, Spain and Germany are consistent with Gregg and Vittori (2008).

country ranking in cross-sectional inequality moderately, as illustrated by the rank correlation of 88,13% between the 1st and last wave[12]. The only constancy is found for Portugal and Denmark, which both in 1994 and 2001, remain the most and the least unequal EU countries. Using Theil, in 1994, in between the two extremes, in ascending order of inequality we find Finland (1996), Netherlands, Belgium, Italy, Austria (1995), Germany, Greece, UK, Luxembourg (1995), Ireland, Spain, and France (gross). In 2001, in between the two extremes we find Greece, France, Spain, Luxembourg, UK, Germany, Ireland, Netherlands, Italy, Finland, Belgium, and Austria. In general, these rankings are consistent across indices.

Changes in the earnings distribution with the accounting period

We complete the earnings distribution picture with the evolution of earnings inequality when we extend the horizon over which inequality is measured, using both an unbalanced and balanced sample (Table 3). As expected, the longer the horizon the lower the inequality in all countries, except Portugal under the balanced approach, where the 8-year inequality is higher than inequality in 1994.[13] Even based on average earnings over the whole sample period, a substantial inequality in the permanent component of earnings is still present in all countries. There is a tendency, however, for the intra-country differences to be smaller when earnings are averaged over several years than in single-year inequality comparisons: e.g. the standard deviation for the Gini coefficients of the eight-year average of earnings is 0.031, but around 0.036 for single-year earnings. The ranking in long-term inequality changes slightly compared with single-year inequality, as illustrated by the high rank correlation 95.16%. Denmark and Finland with the lowest inequality, and Portugal with the highest inequality maintain their ranks. Austria, Belgium and Netherlands converge to values close to Finland, followed by Italy, then Germany, UK, Luxembourg, Greece, Ireland with similar values, and finally France and Spain.

Inequality measures based on the unbalanced approach are higher than those based on the balanced approach, not surprising given that people working over the entire sample are expected to have more stable jobs, and thus lower earnings differentials as opposed to the case when we include also those with unstable jobs.

Next, we turn to the comparison of earnings mobility across the EU over the period 1994 – 2001.

5. Short-term mobility over time

First, is there more mobility in terms of rank changes from one year to the next, in 2000 compared to the 1st wave and what is the potential link with the evolution of cross-sectional inequality? The Dickens index in Table 4 illustrate that, over time, except Denmark, Ireland, Spain, and UK, all other countries record a decrease in short-term mobility, meaning in the opportunity to shift positions in the earnings

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[12] The rank correlation is 81.12% if we do not include Denmark and Portugal, which keep their rank.
[13] This trend is confirmed by all three inequality indices, for all countries.

distribution between consecutive years. Linking with the evolution of cross-sectional inequality over time, we conclude that in 2000 men are: better off both in terms of their relative wage and opportunity to escape low pay in the next period in Denmark, Ireland, Spain, and UK; better off in terms of their relative wage, but worse off in terms of their chance to escape low pay the next period in Austria, Belgium and France; and worse off in terms of both in Finland, Germany, Greece, Italy, Luxembourg, Netherlands and Portugal. These findings, together with the highly significant negative correlation coefficient of -50.3%, bring evidence of a negative association between the evolution of short-term mobility and the evolution of cross-sectional earnings inequality across the EU. The exceptions – Austria, Belgium, and France - however, support the debate that mobility is not always beneficial.

Second, to formalize the link between the evolution of mobility and inequality, we look at the Shorrocks and Fields indices, displayed in Table 4. Short-term mobility, measured by the 2-year Shorrocks index, signals that in 2000 the chronically poor have an increased opportunity to improve their relative position in the distribution of short-term inequality (2-year period inequality) compared with the 1st wave only in Finland, Ireland, Netherlands, and Spain. However, the 2-year Fields index reveals that in 2000 short-term mobility becomes more equalizing of 2-year earnings differentials compared with the 1st wave only in Ireland and Spain, whereas in the Netherlands it turns disequalizing. The differences in findings for Finland and Netherlands between the two indices reinforce the limitations of the Shorrocks measure put forward by Benabou and Ok (2001) and Fields (2008), thus the need to complement the evidence based on Shorrocks with the evidence based on Fields to understand the complex link between mobility and inequality. Both the unbalanced and the balanced approach confirm these trends (Figure 2), except for Spain, where under the "balanced" approach short-term Shorrocks mobility records a decrease, and Ireland where under the "balanced" approach short-term Fields mobility records a decrease. Overall, the Shorrocks index appears to be affected to a lesser extent by differential attrition compared with the Fields index.

6. Long-term mobility versus short-term mobility

Finally, we turn to the comparison of earnings mobility when we extend the period over which mobility is measured. The results are summarized in Table 5 and Figure 3.

6.1. Rank Mobility

In line with previous studies, consistent across countries, the longer the period over which rank mobility is measured the higher the earnings mobility. Ireland stands out with the highest relative increase in rank mobility with the time span - almost 80%. Relating back to the strong negative relationship

between the quintile rank and the growth in real earnings identified in Figure 1, we may conclude that the low wage individuals may be the main beneficiaries of this increase in mobility over the lifecycle.

The ordering of countries in long-term mobility relative to short-term mobility changes substantially as illustrated by Figure 3 (Spearman rank correlation is rather small 51.82%). Luxembourg and Denmark are the least and the most mobile both short and long-term. In between we identify four country clusters: first, Spain, France and Germany; second, Netherlands and Portugal; third UK, Italy and Austria; fourth Greece, Finland, Belgium and Ireland. Judging whether this mobility is high or low depends on the question being asked. Long-term mobility is certainly high enough to make the point that people are not stuck at the bottom top of the earnings distribution. But is there enough mobility to wash out the effect of yearly inequality in a lifetime perspective? To answer, we turn to the Shorrocks and the Fields index.

6.2. Lifetime mobility

So far we found that mobility increases with the horizon over which mobility is measured, meaning that the opportunity to change ones position in the cross-sectional earnings distribution is higher the more years elapse between periods. In this context the lifetime implications of these trends are of interest. Is there any earnings mobility in a lifetime perspective, meaning are the relative income positions observed on an annual basis shuffled in the distribution of long-term or lifetime earnings? Is this mobility equalizing or disequalizing lifetime earnings differentials compared with annual earnings differentials?

Stability profile – Shorrocks Index

To answer the first question we look at the stability profile, both under the unbalanced and the balanced approach, illustrated in Table 5, Figure 4 and Figure 5.[14] To recall, the stability profile plots the Shorrocks rigidity index across different time horizons. In Figure 4 and Figure 5 the time horizons are expressed in reference to the 1st wave for each country. In all countries, the rigidity declines monotonically as the time horizon is extended, meaning lifetime mobility is present. Thus all EU men do have an increasing mobility in the distribution of lifetime earnings as they advance in their career. This trend is consistent across approaches: the stability profiles under the two approaches evolve close to one another (Figure 4), sign of limited impact of differential attrition. Thus the overall conclusions are the same, independent of the approach.

The ordering of countries in long-term mobility relative to short-term mobility changes slightly as illustrated by Figure 3 (Spearman rank correlation is quite high 83.3%%). Over the sample-span

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[14] Both figures contain the same information, organized differently for the ease of the interpretation.

horizon[15], the highest mobility is recorded in Denmark, followed by Finland[16], Austria[17], UK, Belgium, Greece, Ireland, Netherlands, Italy, France, Spain, Germany, Luxembourg[18] and the lowest, Portugal. Therefore Denmark provides the highest opportunity of reducing lifetime earnings differentials relative to cross-sectional ones, and Portugal the lowest.[19]

Mobility Profile – Fields - as equalizer of long-term earnings inequality

Next we introduce the mobility profile based on the Fields index, which unlike Shorrocks, captures whether mobility is equalizing/disequalizing long-term differentials (Table 5, Figure 6, and Figure 7). Overall, mobility increases with the horizon for all countries, except Portugal. The evolution, however, is not monotonic for all countries. All countries except Portugal record positive values of mobility, showing that mobility is equalizing long-term earnings differentials. The story is confirmed by both approaches. For Portugal, mobility turns negative when measured over an 8-year horizon, showing that mobility is exacerbating long-term earning differentials relative to cross-sectional ones.

Consistent across approaches, independent of the horizon, Portugal has the lowest profile, indicating the lowest mobility as equalizer of long term differentials (Figure 7). At the opposite country spectrum, Denmark and Ireland stand out with respect to the steepness of their profiles and to the high level of their long-term mobility. Some convergence trends emerge as the horizon over which mobility is measured increases. For a horizon of 7-8 years, mobility converges to similar values in Denmark and Ireland, in Belgium and France, in Spain and Germany, and in Luxembourg, Greece and Netherlands (Figure 7).

The ordering of countries in long-term Fields mobility relative to short-term mobility changes to a larger extent compared with the Shorrocks index, but to a lesser extent compared with the Dickens index (Figure 3): the Spearman rank correlation is 65.27%. The highest long-term (sample-span) mobility (Figure 3 and Figure 8) is recorded in Ireland and Denmark, followed by Austria[20], France and Belgium with similar values, then UK, Finland[21], Greece, Netherlands, Luxembourg[22], Germany, Spain, Italy, and Portugal with a negative value. Thus, assuming that the 8-year mobility is a good approximation for lifetime mobility, Ireland and Denmark have the highest equalizing mobility in a lifetime perspective, and

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[15] The sample span covers 8 years for 11 countries, 7 years for Austria and Luxembourg, 6 years for Finland. Note that the balanced and unbalanced approaches are the same for the sample-span horizon, as the sample is the same.
[16] Finland has the same ranking when comparing all countries over a 6-year horizon.
[17] Austria has the same ranking when comparing all countries over a 7-year or 6-year horizon.
[18] Idem for Luxembourg.
[19] The ranking between Denmark, UK, Spain and Germany is consistent with the one found by Gregg and Vittori (2008) using the Shorrocks index based on all indices considered, including Theil and Gini.
[20] Austria has the same ranking when comparing all countries over a 7-year or 6-year-horizon.
[21] Finland has the same ranking when comparing all countries over a 6-year horizon.
[22] Luxembourg has the same ranking when comparing all countries over a 7-year or 6-year horizon.

Italy, Spain and Germany the lowest. Portugal is the only country where mobility acts as a disequalizer of lifetime differentials.

Comparing between Figure 6 and Figure 4, the Fields index appears to be affected to a larger extent by differential attrition than the Shorrocks index.

Inferences for lifetime inequality ranking

The overall information revealed by the two indices is summarized in Figure 8 and Table 5. Comparing the rankings in long-term mobility between the Shorrocks and the Fields index the mobility pictures differ to a moderate extent, confirmed also by the moderate Spearman rank correlation (70.55%) between the long-term Shorrocks and Fields index. Portugal records the lowest values based on both indices. Lifetime mobility is present in Portugal, but is disequalizing, thus it does not benefit the chronically poor. Denmark, Finland, Austria, UK, Belgium and Ireland rank among the seven highest in both Shorrocks and Fields lifetime mobility, suggesting that they have the highest lifetime mobility with the highest equalizing impact on lifetime earnings differentials. Denmark scores the highest in lifetime mobility, but the second highest after Ireland in equalizing mobility, suggesting that mobility in Ireland is slightly more equalizing in a lifetime perspective than in Denmark. Compared with the other countries, Denmark has a higher lifetime mobility with a higher lifetime equalizing impact.

Linking back with the ranking in long-term inequality, we attempt to make inferences regarding lifetime inequality country rankings. We start from the country rankings in long-term inequality in Section 4, and try to deduce the potential re-rankings that may take place in a lifetime perspective.

Denmark is the least unequal long-term, has the highest Shorrocks mobility and the most equalizing mobility, thus it is expected to have the lowest inequality in a lifetime perspective. At the opposite extreme we find unequivocally Portugal. Austria may become less unequal than Finland in a lifetime perspective, given that Austria has a higher equalizing mobility. Irrespective of their relative ranks, Finland and Austria are expected to be among the three least unequal countries in a lifetime perspective after Denmark. For the other countries, we do not always find a complete consistency in lifetime inequality rankings based on the Shorrocks and the Field indices. For example, Germany may become less unequal than Italy in a lifetime perspective, given its more equalizing mobility, and more unequal given its lower Shorrocks mobility. The examples do not stop here, indicating that the Shorrocks and the Fields index indeed capture different facets of mobility. More should be done in the future to settle this dilemma.

We complete the ranking in lifetime inequality relying on the Fields index. Diagram 1 illustrates the ranking. Belgium has a lower long-term mobility and a higher equalizing mobility than all countries, except Denmark, Finland and Austria, thus is expected to be the fourth country in lifetime inequality.

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Netherlands and the UK are expected to rank next in lifetime inequality. They may interchange ranks however, given that the UK has a more equalizing long-term mobility than the Netherlands. Next we expect to find a cluster formed by Italy, Germany, Luxembourg, Greece, Ireland and France, expect to interchange their ranks. At the end of the lifetime inequality spectrum we expect to find Spain and Portugal, which have the highest long-term inequality and the least equalizing mobility.

7. Concluding remarks

This study approached the mobility-inequality relationship at the EU level over the period 1994-2001 on two axes: first the evolution of short-term inequality and its link with cross-sectional inequality and short-term inequality; second, the evolution of long-term mobility relative to short-term mobility and the implications for lifetime or long-term inequality. Our results can be summarized briefly.

The changing shape of the distribution of hourly earnings in the EU after 1994 illustrates that hourly earnings of the low paid individuals improved to a larger extent than those of the better off in most countries, except in the Netherlands, Germany, Greece and Finland, where the opposite holds. Moreover, Netherlands is the only country where low paid men recorded a deterioration in their work pay. These trends may explain the increase in cross-sectional inequality in these four countries. Cross-sectional inequality is found to increase also in Italy, Luxembourg and Portugal, despite the negative association between the quintile rank and the growth in real earnings.

For understanding these trends in cross-sectional earnings inequality we looked at the evolution of short-term mobility. We find evidence supporting a negative association between the evolution of cross-sectional inequality and short-term rank mobility across the EU. In Germany, Netherlands, Luxembourg, Italy, Greece, Finland and Portugal the decrease in mobility as identified by the evolution of the short-term Dickens rank mobility index may be a possible explanation for the increase in cross-sectional inequality. Additional proof is found in Denmark, UK, Ireland, and Spain, where the increase in short-term rank mobility appears to have an equalizing effect on cross-sectional differentials: : in 2000, men are better off both in terms of their relative wage and their opportunity to escape low pay in the next period. Some exceptions are present, supporting the debate that mobility is not always beneficial, having a disequalizing effect: in 2000, men in Belgium, France and Austria are found to be better off in terms of their relative wage, despite being worst off in terms of their chance to escape low pay next year.

The rank measures, however do not incorporate the relationship between income mobility and income inequality. To achieve this link, we explored an alternative class of mobility measures – as equalizer of longer-term earnings. First, we explored the traditional Shorrocks index, which, given its limitations in capturing the equalizing effects put forward by Benabou and Ok (2001) and Fields (2008), is interpreted here as the earnings mobility in a long-term perspective, meaning the opportunity that men have to shuffle

long-term their relative income positions observed on an annual basis. Second we introduced the Fields index, which circumvents the limitations of the Shorrcks index. To asses how the equalizing effect of mobility changed over time we choose the shortest horizon – periods one year apart.

The 2-year Shorrocks index signals that in 2000 men have an increased opportunity to improve their relative position in the distribution of short-term inequality (2-year period inequality) compared with the 1st wave only in the Netherlands, Ireland, Spain and Finland. The 2-year Fields index, however, reveals that in 2000 short-term mobility becomes more equalizing of 2-year earnings differentials compared with the 1st wave only in Ireland and Spain, whereas in the Netherlands it turns disequalizing.

The contradiction in the findings for the Netherlands and Finland between the Shorrocks and the Fields index puts forward the need of complementing the two indices for a complete picture: in the Netherlands, mobility increases (based on Shorrocks), but it turns disequalizing of 2-year earnings differentials (based on Fields). Linking back to the evolution of the short-term rank mobility and to the positive association found between the quantile rank and the growth in real earnings, we conclude that in the Netherlands the changes in the labour market favoured the better off individuals in the detriment of the low paid men. Similarly in Finland, but to a much lesser extent, as short-term mobility just decreased its equalizing impact remaining positive.

Shifting from the short-term to the long-term perspective, we find that the ranking in long-term inequality does not change to a large extent compared with annual inequality, sign of limited lifetime mobility within countries, either equalizing or disequalizing: Portugal remains by far the most unequal EU country, and Denmark and Finland the least unequal even over an 8-year horizon. The ranking in earnings mobility differs, both across indices and across horizons. Long-term, Denmark renders unequivocally the most mobile earnings distribution with the second highest equalizing effect in the EU. Using the rank measure, men in Luxembourg are found to have the lowest opportunity to improve their position in the distribution of earnings long-term. In terms of the opportunity to shuffle long-term the relative income positions observed on an annual basis, the lowest value is found in Portugal. The least equalizing long-term mobility is found in Italy, and the only disequalizing mobility in a lifetime perspective in Portugal. Coupling the information provided by the Shorrocks and the Fields indices, across the EU, Denmark, Finland, Austria, UK, Belgium, and Ireland are found to have the highest lifetime mobility with the highest equalizing impact on lifetime earnings differentials.

Linking the rankings in long-term Fields mobility with the rankings in long-term inequality, we form expectations regarding the country ranking in lifetime inequality: unequivocally, Denmark is expected to have the lowest lifetime earnings inequality across the 14 EU countries, and Spain and Portugal the highest. After Denmark, among the least three unequal countries we expect Finland and Austria, followed

on the fourth place by Belgium. Next, with a higher lifetime inequality we expect Netherlands and/or UK, then the other six countries.

Besides making a substantive contribution to the literature on cross-national comparisons of earnings mobility at the EU level, our paper contributes to the existing literature in two more ways. First, we bring evidence regarding the limitation of the Shorrocks measure in capturing the equalizing/disequalizing effect of mobility, put forward by Benabou and Ok (2001) and Fields (2008). We argue for the need to complement the information brought by the Shorrocks index with additional measures that capture mobility as an equalizer of long-term differentials, in the tradition of Fields (2008), in order to make inferences regarding lifetime earnings distributions. Second, by comparing the findings between the "unbalanced" and the "balanced approach", meaning between including/and not the individuals that exited and (re)entered the panel, we explored the impact of differential attrition on the study of earnings mobility as an equalizer of long-term differentials. The Fields index is found to be more sensitive to differential attrition than Shorrocks. The overall qualitative conclusions regarding the evolution of mobility over time and across horizons are not affected, whereas more differences are observed for the country rankings.

Table 1. Inflows and Outflows of Individuals in the Sample

t		1994	1995	1996	1997	1998	1999	2000	2001
Germany	N | Wage$_t$ >0	25018	26059	25806	24889	23290	22955	21909	20703
	N| balanced	11057							
	(%$_{t-1}$ |Wage$_t$ >0)		66.99	67.37	66.2	63.01	64.84	64.86	64.39
Denmark	N | Wage$_t$ >0	20899	20399	19190	19062	17321	16235	15678	15380
	N| balanced	8247							
	(%$_{t-1}$ |Wage$_t$ >0)		68.74	66.59	69.43	66.23	67.41	69.6	71.6
Netherlands	N | Wage$_t$ >0	20221	22100	22892	22753	22863	23233	24065	24130
	N| balanced	8173							
	(%$_{t-1}$ |Wage$_t$ >0)		69.07	71.37	68.68	67.52	67.24	68.56	69.59
Belgium	N | Wage$_t$ >0	35342	34367	33280	32378	31129	29414	28087	26538
	N| balanced	16910							
	(%$_{t-1}$ |Wage$_t$ >0)		63.43	63.65	64.38	63.88	64.28	65.15	64.38
Luxembourg	N | Wage$_t$ >0		15829	13695	14489	13403	14075	12667	12992
	N| balanced	7283							
	(%$_{t-1}$ |Wage$_t$ >0)			64.75	69.48	69.33	69.81	68.71	70.39
France	N | Wage$_t$ >0	20137	19270	19042	17906	14467	14012	13760	14212
(gross amounts)	N| balanced	5895							
	(%$_{t-1}$ |Wage$_t$ >0)		62.47	64.76	62	52.08	54.24	55.54	60.8
UK	N | Wage$_t$ >0	24949	25329	25495	26010	26145	25750	25674	25264
	N| balanced	13977							
	(%$_{t-1}$ |Wage$_t$ >0)		64.59	66.31	67.06	67.04	67.36	68.33	68.58
Ireland	N | Wage$_t$ >0	13937	13221	12590	12515	12435	12091	10745	9727
	N| balanced	4453							
	(%$_{t-1}$ |Wage$_t$ >0)		49.99	50.04	52.41	53.13	54.1	51.63	54.65
Italy	N | Wage$_t$ >0	32633	32236	32111	29661	28865	26993	26912	25170
	N| balanced	12070							
	(%$_{t-1}$ |Wage$_t$ >0)		51.58	51.19	47.18	47.34	46.87	48.73	48.86
Greece	N | Wage$_t$ >0	27974	27654	26150	24865	22675	22001	21335	21929
	N| balanced	9404							
	(%$_{t-1}$ |Wage$_t$ >0)		45.83	45.69	44.98	42.09	43.52	46.06	49.72
Spain	N | Wage$_t$ >0	22559	21863	21296	20975	20371	20580	19898	20185
	N| balanced	7234							
	(%$_{t-1}$ |Wage$_t$ >0)		47.6	48.29	48.49	48.63	52.13	52.12	56.06
Portugal	N | Wage$_t$ >0	14653	15450	15379	15087	14837	14569	14604	14550
	N| balanced	6214							
	(%$_{t-1}$ |Wage$_t$ >0)		57.84	57.5	57.32	56.98	59.12	60.83	62.16
Austria	N | Wage$_t$ >0		17944	17789	17199	16209	15162	13816	13056
	N| balanced	8127							
	(%$_{t-1}$ |Wage$_t$ >0)			67.96	68.2	67.49	67.2	66.51	68.21
Finland	N | Wage$_t$ >0			15811	15845	15895	15546	13329	13057
	N| balanced	6913							
	(%$_{t-1}$ |Wage$_t$ >0)				55.95	57.2	59.29	53.83	64.16

Note: N\| Wage$_t$ >0 refers to the number of individuals recording positive hourly earnings expressed in Euro in year *t*. N\|balanced is the number of individuals with positive earnings over the entire period. (%$_{t-1}$ \| Wage$_t$ >0) is the share of individuals present in the sample in year *t-1* which record positive earnings in year *t*.

Table 2. Earnings Inequality (Index*100)

		1994	1995	1996	1997	1998	1999	2000	2001
Germany	Gini	22.15	22.34	22.04	21.89	22.58	22.81	22.75	22.54
	Theil	8.22	8.61	8.23	8.06	8.85	8.96	8.92	8.72
	A(1)	8.08	8.38	8.04	7.84	8.12	8.53	8.41	8.17
Denmark	Gini	15.76	15.26	15.52	15.21	14.24	14.68	14.94	14.05
	Theil	4.22	3.92	4.23	4.15	3.37	3.73	3.83	3.35
	A(1)	4.26	3.78	4.10	3.96	3.37	3.76	3.78	3.33
Netherlands	Gini	18.07	18.37	19.19	18.80	18.93	17.92	18.18	20.67
	Theil	5.63	5.76	6.32	6.07	5.96	5.40	5.56	7.25
	A(1)	5.56	5.77	6.33	5.90	5.65	5.18	5.44	7.08
Belgium	Gini	19.10	17.71	17.64	18.13	17.53	17.33	17.13	17.85
	Theil	6.23	5.37	5.35	5.58	5.15	5.11	5.04	5.48
	A(1)	5.92	4.95	5.04	5.24	4.85	4.92	4.69	5.14
Luxembourg	Gini		25.23	24.74	25.41	25.62	26.58	26.50	26.32
	Theil		10.09	9.85	10.24	10.37	11.19	11.15	10.89
	A(1)		9.88	10.00	10.16	10.02	10.95	11.09	10.66
France	Gini	27.62	26.47	26.26	27.23	27.28	27.41	26.83	26.49
	Theil	13.21	12.04	11.63	12.88	12.58	12.65	11.94	11.87
	A(1)	11.64	10.88	10.58	11.41	11.54	11.59	11.17	10.98
UK	Gini	24.26	24.22	23.35	23.36	23.54	23.25	23.35	23.51
	Theil	10.08	10.01	9.20	9.05	9.24	9.08	9.16	9.29
	A(1)	9.25	9.19	8.57	8.46	8.55	8.32	8.46	8.51
Ireland	Gini	27.59	26.87	25.76	25.47	25.00	23.39	22.77	21.70
	Theil	12.87	11.97	11.00	10.83	10.60	9.31	8.78	7.85
	A(1)	11.84	11.21	10.50	10.14	9.85	8.66	8.15	7.64
Italy	Gini	19.16	18.47	19.02	18.93	19.85	19.72	19.78	19.90
	Theil	6.51	6.08	6.42	6.29	7.13	7.01	7.08	7.19
	A(1)	5.99	5.58	5.91	5.78	6.41	6.30	6.33	6.39
Greece	Gini	23.62	24.37	23.80	25.55	25.66	26.98	26.51	26.37
	Theil	9.51	9.97	9.44	11.23	11.09	12.20	11.93	12.17
	A(1)	8.77	9.13	8.70	9.97	9.99	10.97	10.68	10.55
Spain	Gini	27.87	28.27	28.19	28.71	28.37	26.99	26.36	26.07
	Theil	13.08	13.22	13.36	13.67	13.47	12.69	12.09	11.47
	A(1)	11.84	12.13	11.94	12.33	12.17	11.07	10.60	10.28
Portugal	Gini	30.05	31.14	30.66	30.85	31.13	30.11	31.32	31.72
	Theil	15.79	16.93	16.76	17.27	18.01	17.21	18.86	19.27
	A(1)	13.23	14.16	13.80	14.05	14.37	13.55	14.60	14.92
Austria	Gini		19.49	18.34	18.34	17.39	17.07	16.72	16.85
	Theil		6.67	5.84	5.90	5.27	5.10	4.93	4.97
	A(1)		6.44	5.62	5.52	4.87	4.80	4.67	4.82
Finland	Gini			17.32	17.80	17.30	17.81	17.10	18.50
	Theil			5.22	5.46	5.23	5.38	5.08	5.98
	A(1)			4.94	5.29	4.83	5.19	4.76	5.53

Table 3. Short and Long-term inequality

Inequality (Theil)	Ge	Dk	Nl	Be	Lu	Fr	UK	Ir	It	Gr	Sp	Pt	Au	Fi
Unbalanced														
1st wave	0.0822	0.0422	0.0563	0.0623	0.1009	0.1321	0.1008	0.1287	0.0651	0.0951	0.1308	0.1579	0.0667	0.0522
1st wave - 2nd wave	0.0744	0.0316	0.0468	0.0496	0.0869	0.106	0.0866	0.1109	0.054	0.0801	0.1179	0.1524	0.0514	0.0422
1st wave -3rd wave	0.0714	0.0288	0.0458	0.0454	0.0786	0.0958	0.0775	0.0979	0.0512	0.0745	0.1124	0.1474	0.0479	0.0398
1st wave – 4th wave	0.0688	0.0266	0.0443	0.043	0.0751	0.0931	0.0726	0.0916	0.0495	0.0767	0.1078	0.1449	0.043	0.036
1st wave – 5th wave	0.0655	0.0252	0.0435	0.0419	0.074	0.0929	0.0685	0.086	0.0497	0.0729	0.106	0.144	0.0399	0.0351
1st wave – 6th wave	0.0623	0.0232	0.0424	0.0399	0.0678	0.0915	0.0653	0.0819	0.049	0.0756	0.1046	0.1381	0.0372	0.0346
1st wave-7th wave	0.0602	0.0211	0.0416	0.0388	0.0664	0.0874	0.0635	0.0786	0.0496	0.0732	0.1	0.1393	0.0371	
1st wave-8th wave	0.06	0.0205	0.0395	0.0395		0.0847	0.063	0.0718	0.0494	0.0698	0.0929	0.1423		
Balanced														
1st wave	0.0709	0.0329	0.0479	0.0516	0.0797	0.1113	0.0803	0.1163	0.0573	0.0848	0.1092	0.1414	0.0500	0.0422
1st wave - 2nd wave	0.0655	0.0282	0.0431	0.0425	0.0701	0.0971	0.0709	0.1042	0.0520	0.0744	0.0966	0.1340	0.0438	0.0373
1st wave -3rd wave	0.0644	0.0264	0.0431	0.0408	0.0671	0.0908	0.0676	0.0917	0.0500	0.0737	0.0944	0.1380	0.0411	0.0347
1st wave – 4th wave	0.0624	0.0241	0.0416	0.0403	0.0667	0.0889	0.0653	0.0866	0.0479	0.0728	0.0940	0.1388	0.0394	0.0348
1st wave – 5th wave	0.0617	0.0229	0.0407	0.0403	0.0667	0.0881	0.0636	0.0822	0.0485	0.0715	0.0942	0.1373	0.0380	0.0342
1st wave – 6th wave	0.0611	0.0219	0.0401	0.0395	0.0665	0.0871	0.0632	0.0791	0.0487	0.0714	0.0938	0.1382	0.0375	0.0346
1st wave-7th wave	0.0604	0.0210	0.0393	0.0396	0.0664	0.0854	0.0632	0.0749	0.0491	0.0702	0.0942	0.1400	0.0371	
1st wave-8th wave	0.0600	0.0205	0.0395	0.0395		0.0847	0.0630	0.0718	0.0494	0.0698	0.0929	0.1423		

Table 4. Short-term mobility over time – unbalanced

Mobility Index	Ge	Dk	Nl	Be	Lu	Fr	UK	Ir	It	Gr	Sp	Pt	Au	Fi
Dickens														
1st wave - 2nd wave	18.85	26.65	19.33	27.01	14.39	22.50	21.12	21.43	25.52	29.52	21.51	20.64	28.61	26.39
2000-2001	17.44	27.08	19.00	20.71	13.07	17.28	21.67	23.37	20.53	18.68	26.08	17.17	19.16	25.27
Shorocks														
1st wave - 2nd wave	0.053	0.108	0.078	0.106	0.051	0.107	0.088	0.077	0.085	0.130	0.065	0.048	0.108	0.111
2000-2001	0.046	0.108	0.082	0.057	0.042	0.055	0.073	0.078	0.060	0.058	0.078	0.040	0.062	0.114
Fields														
1st wave - 2nd wave	0.067	0.168	0.085	0.170	0.080	0.153	0.116	0.127	0.094	0.131	0.091	0.057	0.130	0.104
2000-2001	0.053	0.165	-0.018	0.050	0.072	0.067	0.102	0.128	0.051	0.050	0.121	0.028	0.056	0.023

Table 5. Short-term and long-term mobility

| Mobility Index	Ge	Dk	Nl	Be	Lu	Fr	UK	Ir	It	Gr	Sp	Pt	Au	Fi
Dickens														
1st wave - 2nd wave	0.189	0.267	0.193	0.270	0.144	0.225	0.211	0.214	0.255	0.295	0.215	0.206	0.286	0.264
1st wave -3rd wave	0.223	0.314	0.202	0.282	0.170	0.243	0.239	0.276	0.279	0.302	0.249	0.256	0.312	0.304
1st wave – 4th wave	0.242	0.355	0.226	0.311	0.172	0.259	0.260	0.299	0.304	0.315	0.250	0.273	0.321	0.346
1st wave – 5th wave	0.251	0.389	0.259	0.300	0.188	0.251	0.292	0.331	0.329	0.332	0.257	0.283	0.347	0.358
1st wave – 6th wave	0.265	0.385	0.276	0.333	0.205	0.279	0.305	0.335	0.333	0.324	0.275	0.303	0.360	0.365
1st wave-7th wave	0.281	0.405	0.305	0.351	0.224	0.291	0.338	0.356	0.343	0.359	0.303	0.323	0.357	
1st wave-8th wave	0.305	0.427	0.318	0.372		0.300	0.351	0.384	0.354	0.378	0.296	0.320		
Shorrocks														
1st wave - 2nd wave	0.053	0.108	0.078	0.106	0.051	0.107	0.088	0.077	0.085	0.130	0.065	0.048	0.108	0.111
1st wave -3rd wave	0.086	0.156	0.097	0.130	0.076	0.130	0.128	0.116	0.106	0.145	0.093	0.069	0.150	0.150
1st wave – 4th wave	0.093	0.186	0.111	0.155	0.083	0.141	0.149	0.128	0.122	0.156	0.102	0.079	0.167	0.173
1st wave – 5th wave	0.092	0.217	0.127	0.159	0.089	0.140	0.165	0.146	0.137	0.168	0.107	0.080	0.177	0.188
1st wave – 6th wave	0.108	0.235	0.141	0.171	0.100	0.141	0.172	0.160	0.145	0.169	0.109	0.080	0.193	0.218
1st wave-7th wave	0.115	0.260	0.150	0.187	0.104	0.137	0.180	0.165	0.145	0.175	0.120	0.080	0.198	
1st wave-8th wave	0.124	0.267	0.173	0.185		0.135	0.186	0.176	0.149	0.180	0.132	0.093		
Fields														
1st wave - 2nd wave	0.067	0.168	0.085	0.170	0.080	0.153	0.116	0.127	0.094	0.131	0.091	0.057	0.130	0.104
1st wave -3rd wave	0.115	0.199	0.087	0.205	0.119	0.194	0.177	0.233	0.122	0.150	0.120	0.063	0.190	0.132
1st wave – 4th wave	0.129	0.260	0.099	0.201	0.135	0.222	0.222	0.279	0.141	0.150	0.118	0.064	0.251	0.139
1st wave – 5th wave	0.105	0.272	0.115	0.218	0.142	0.224	0.215	0.329	0.122	0.123	0.140	0.049	0.226	0.172
1st wave – 6th wave	0.121	0.309	0.140	0.237	0.161	0.238	0.224	0.374	0.141	0.130	0.140	0.070	0.239	0.180
1st wave-7th wave	0.141	0.356	0.160	0.232	0.167	0.231	0.223	0.342	0.145	0.167	0.136	0.048	0.259	
1st wave-8th wave	0.153	0.376	0.175	0.235		0.240	0.216	0.382	0.138	0.177	0.149	-0.007		

Notes: * 7th wave for Austria and Luxembourg, 6th wave for Finland
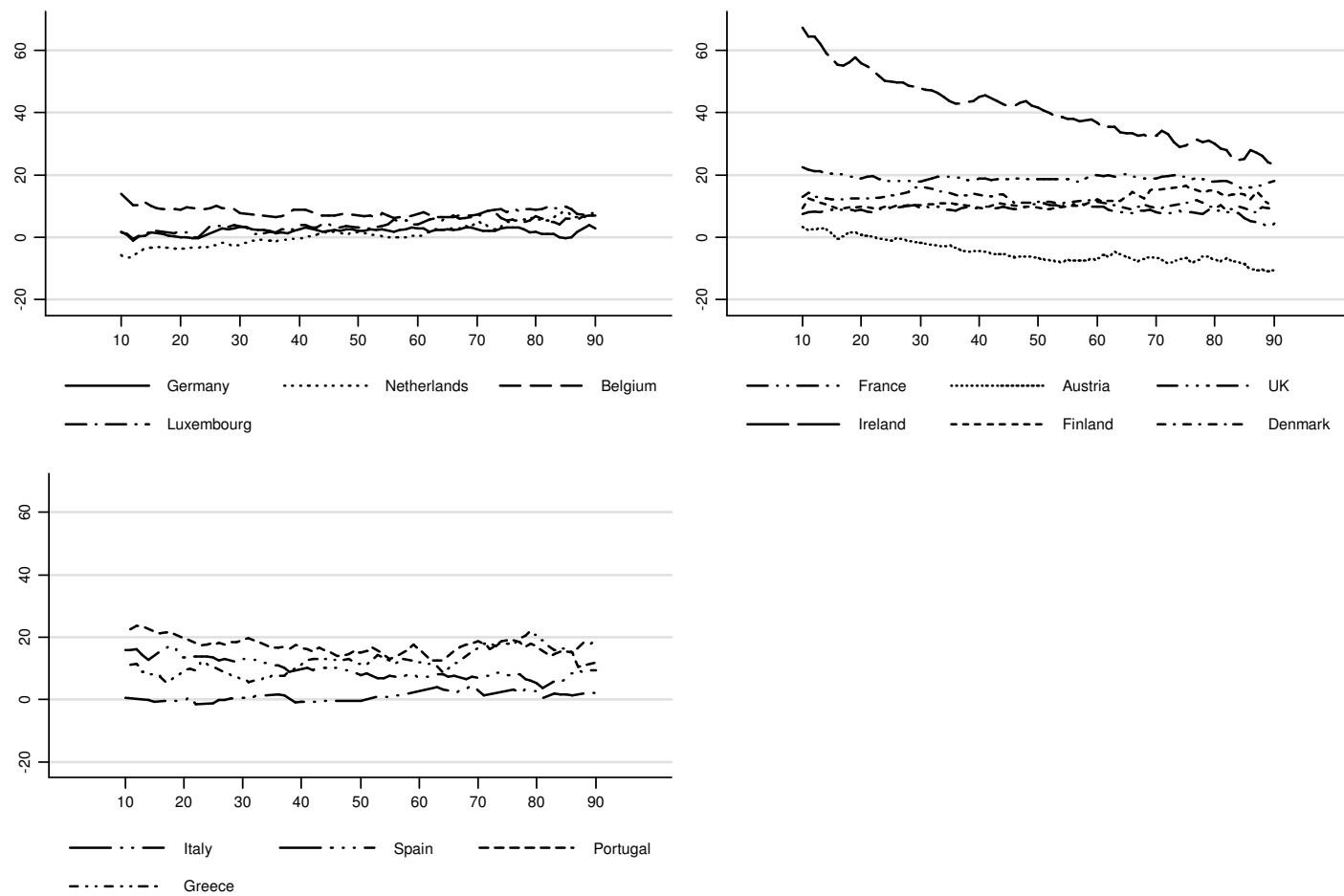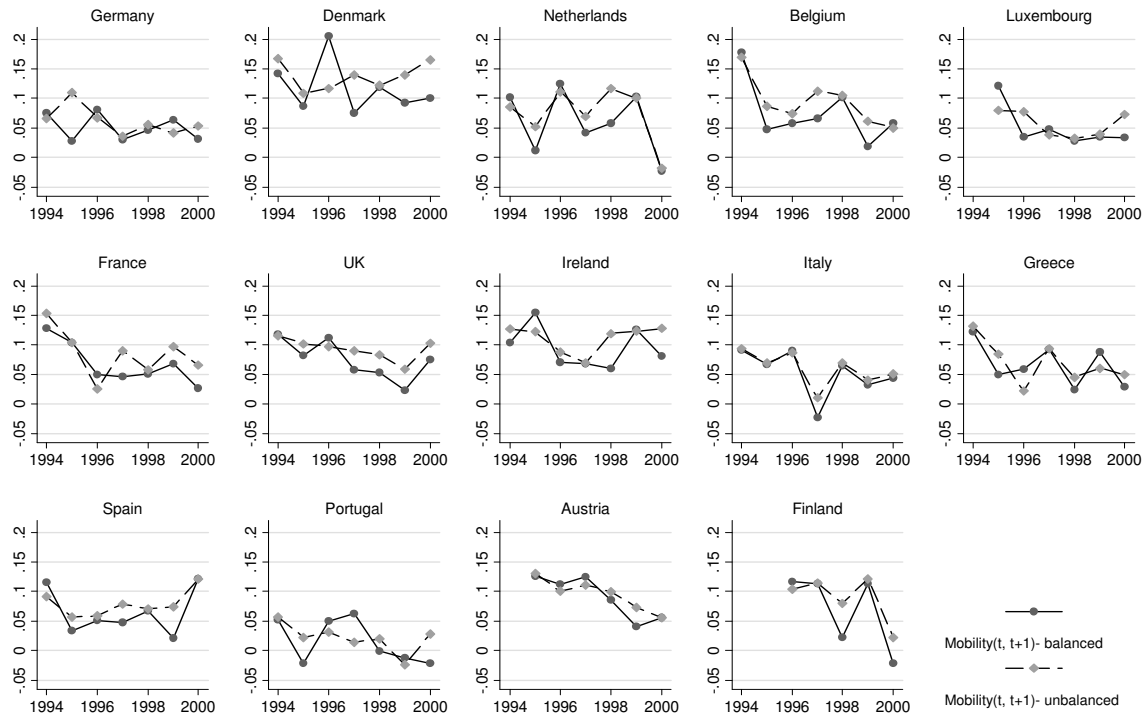
Figure 1. Percentage Change in Mean Hourly Earnings by Percentiles Over The Sample Period
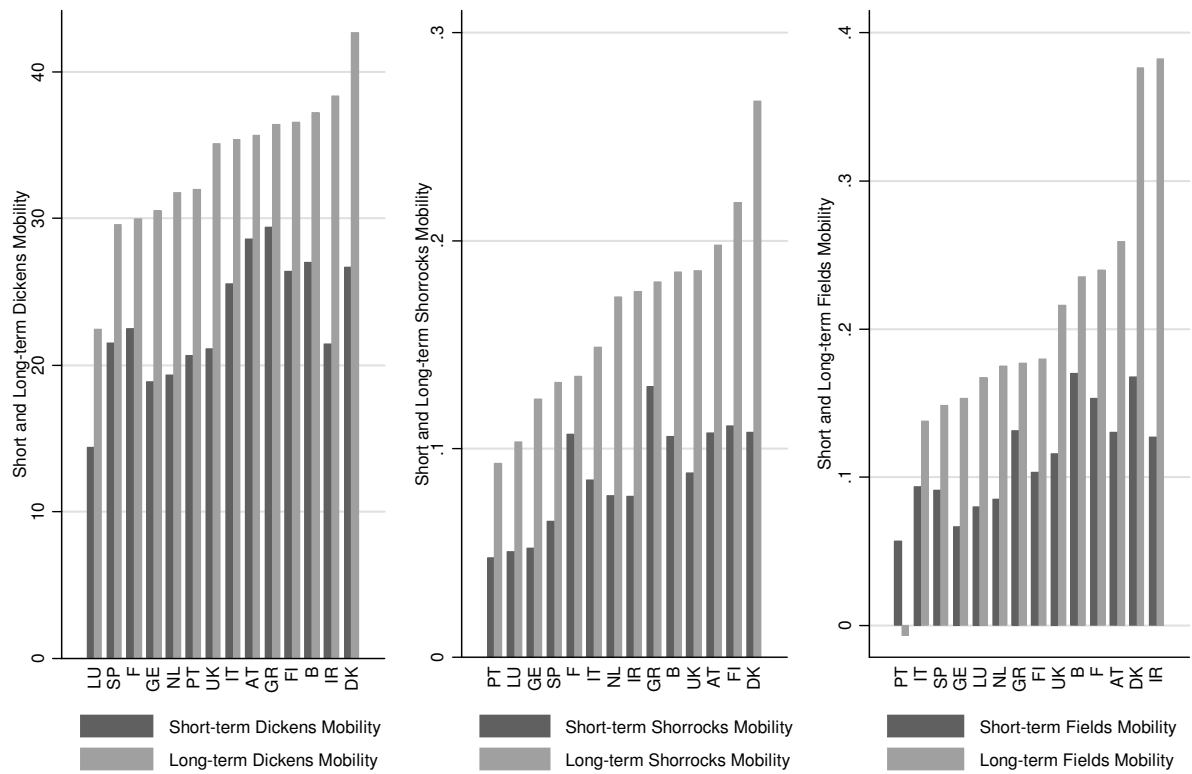
21

2-Year Shorrocks Mobility Over Time
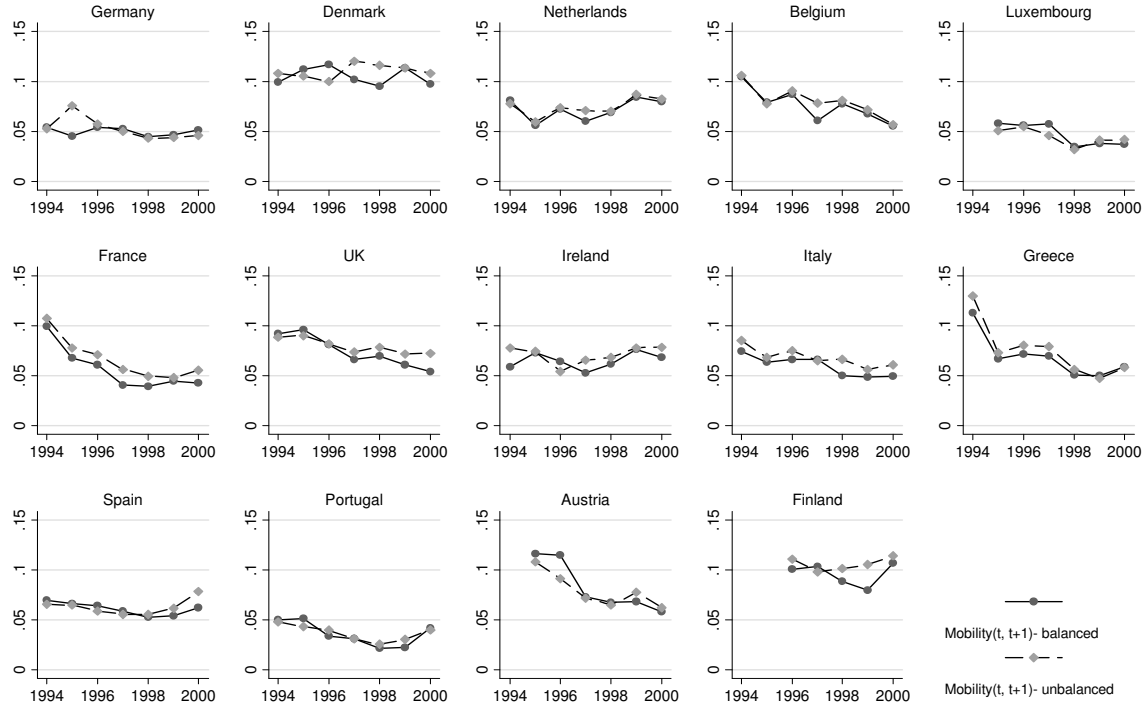
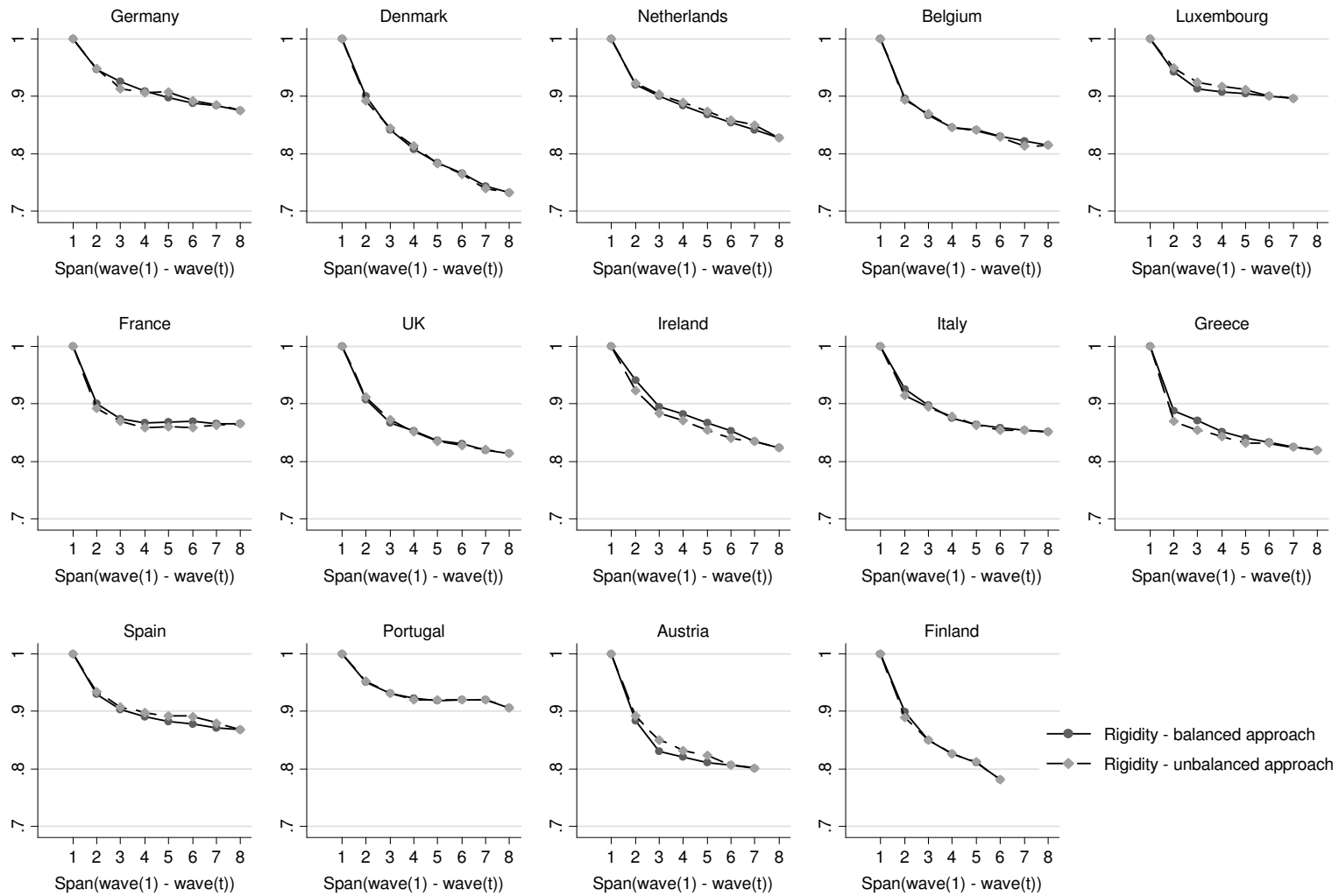## 2-Year Fields Mobility Over Time

**Figure 2. The Evolution of 2-Year Period Mobility**

22

Figure 3. Short and Long-Term Mobility

Spearman rank correlation: 51.82% (Dickens), 83.30% Shorrocks, 78.90% Fields)

Figure 4. Stability Profiles for Male Earnings by Selected Countries (based on Theil) – Balanced vs Unbalanced

Note: The stability profile plots the rigidity index against the horizon over which the index is measured: 1-year rigidity = 1; 2-year rigidity = rigidity index over a horizon of 2 years, span wave(1)-wave(2); 8-year rigidity = rigidity index over a horizon of 8 years, span wave(1)-wave(8))
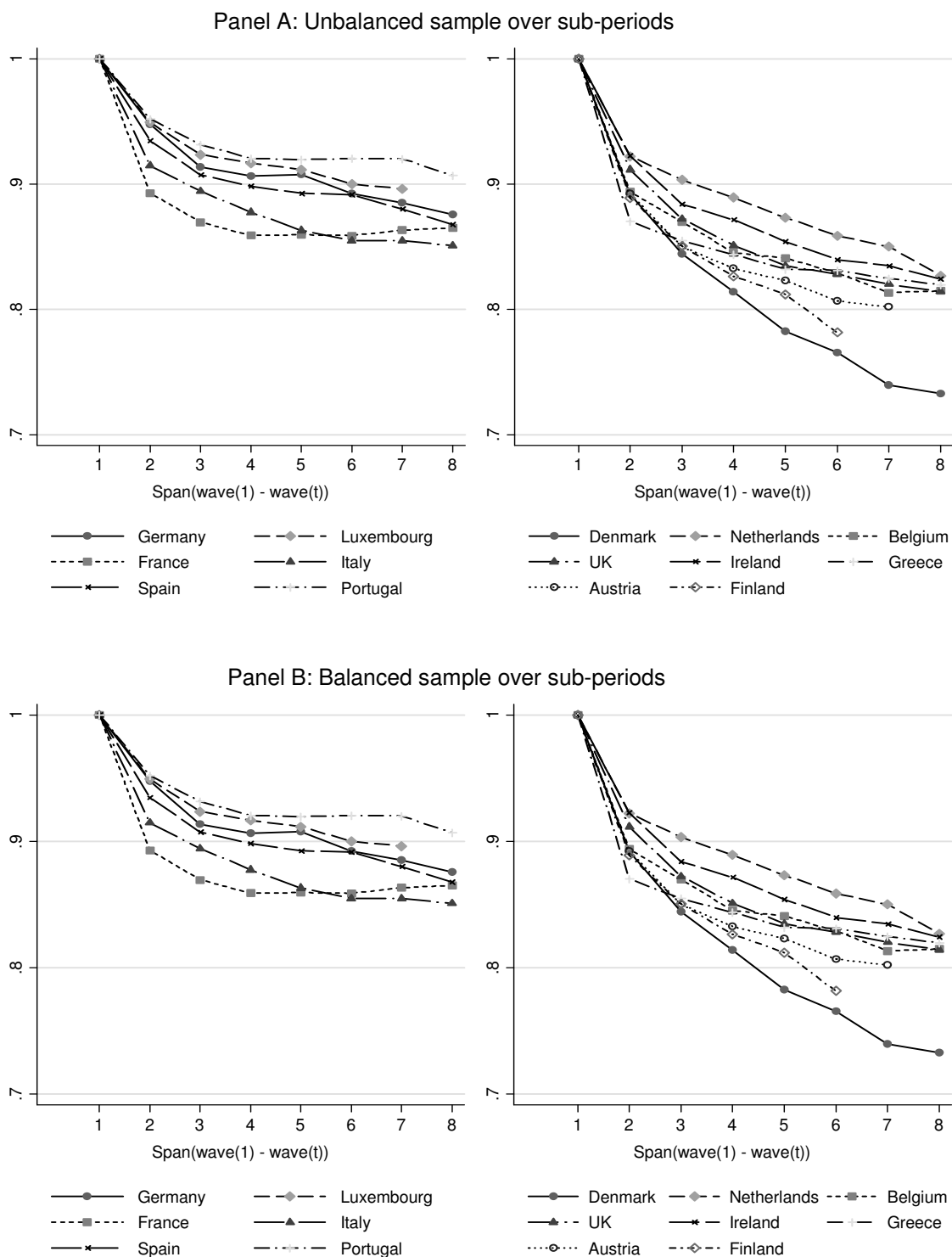
Figure 5. Stability Profiles for Male Earnings for Selected Countries (based on Theil) - – Balanced vs Unbalanced

Note: The stability profile plots the rigidity index against the horizon over which the index is measured: 1-year rigidity = 1; 2-year rigidity = rigidity index over a horizon of 2 years, span wave(1)-wave(2); 8-year rigidity = rigidity index over a horizon of 8 years, span(wave(1)-wave(8))
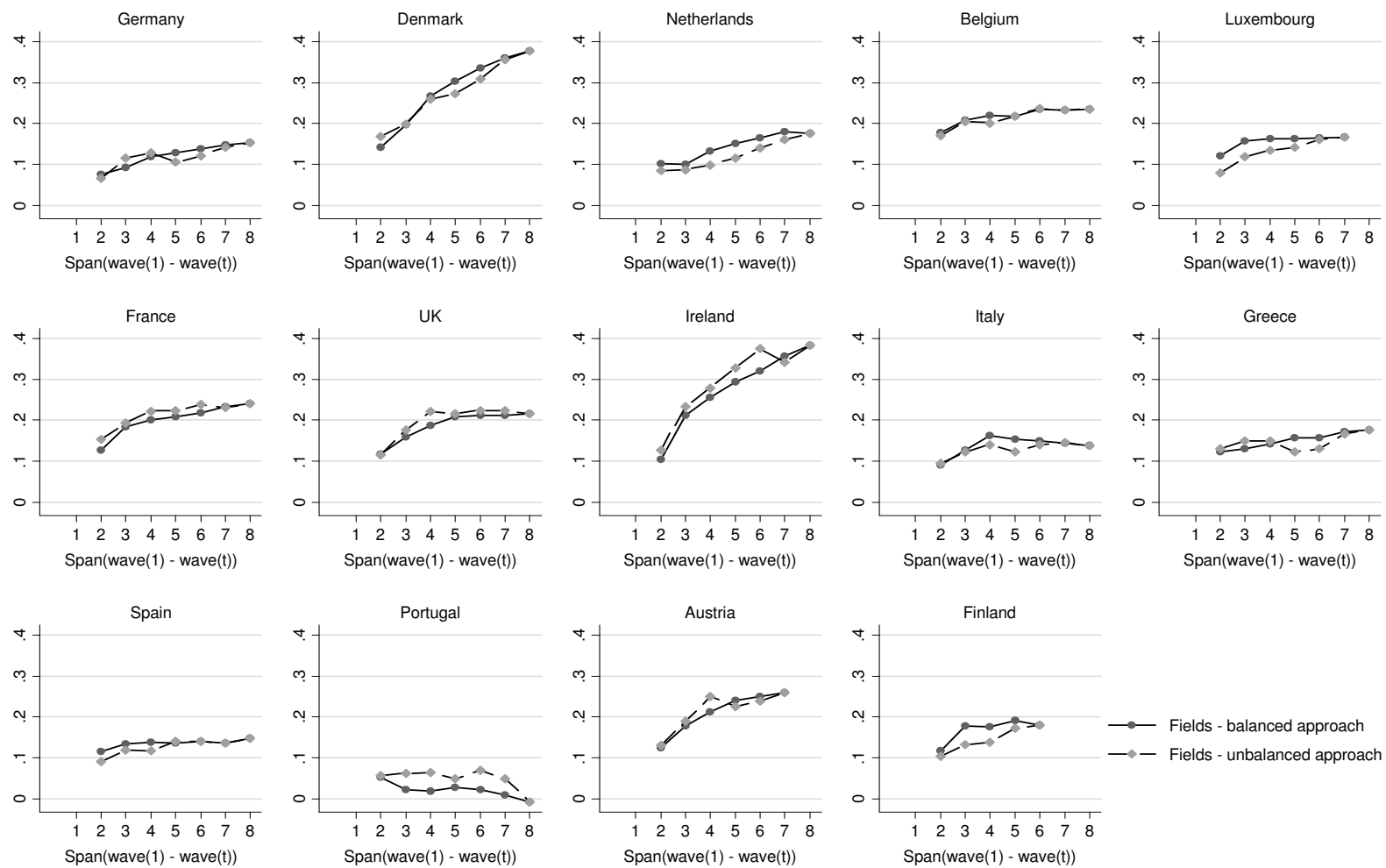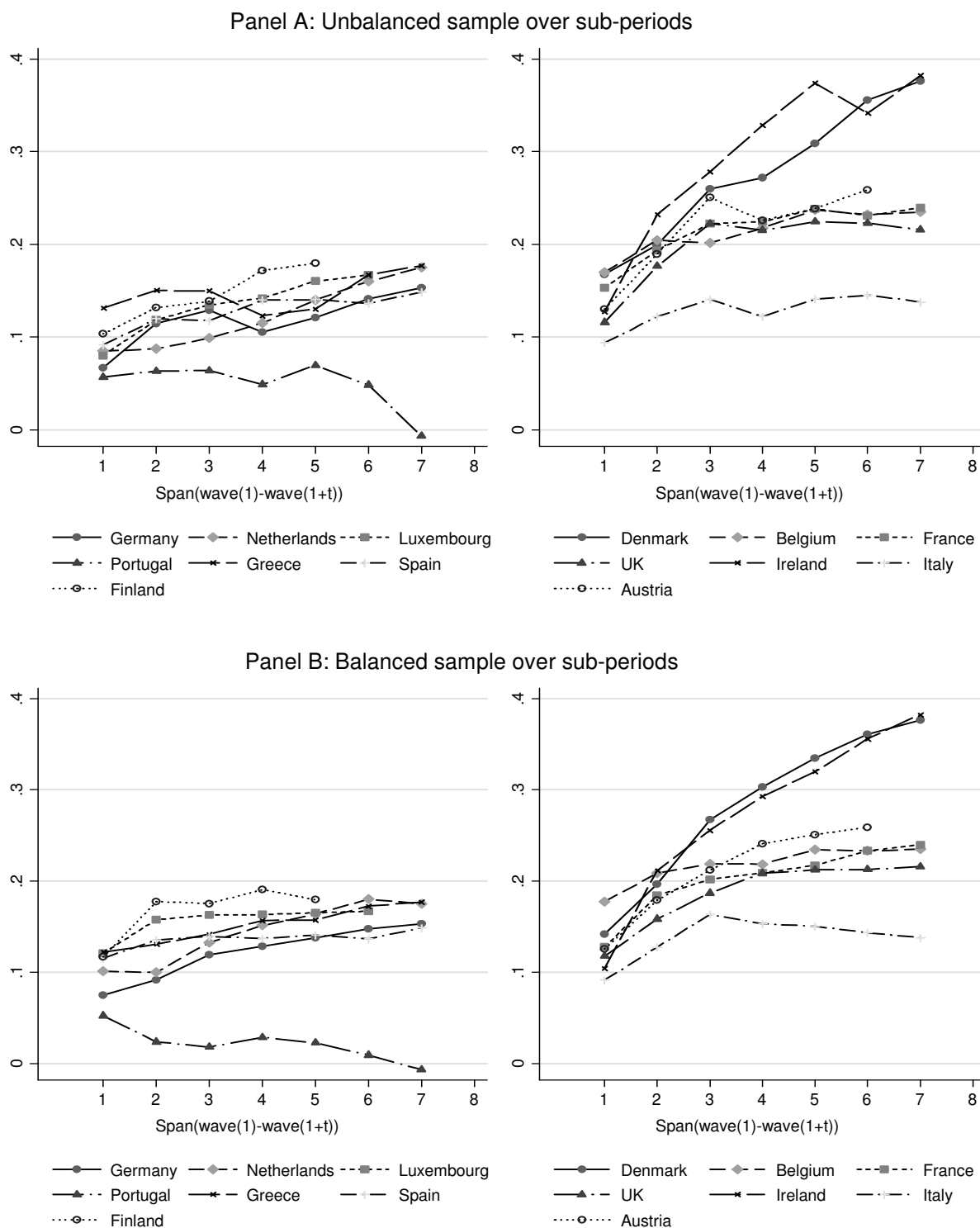
Figure 6. Mobility Profile based on the Fields Index

Note: The mobility profile plots the Fields index against the horizon over which the index is measured: 1-year mobility = 1; 2-year mobility = mobility index over a horizon of 2 years, span wave(1)-wave(2); 8-year mobility = mobility index over a horizon of 8 years, span(wave(1)-wave(8))

Panel A: Unbalanced sample over sub-periods

Left chart legend: Germany, Netherlands, Luxembourg, Portugal, Greece, Spain, Finland

Right chart legend: Denmark, Belgium, France, UK, Ireland, Italy, Austria

x-axis: Span(wave(1)-wave(1+t))

Panel B: Balanced sample over sub-periods

Left chart legend: Germany, Netherlands, Luxembourg, Portugal, Greece, Spain, Finland

Right chart legend: Denmark, Belgium, France, UK, Ireland, Italy, Austria

x-axis: Span(wave(1)-wave(1+t))

Figure 7. Mobility Profile based on the Fields Index

Note: The mobility profile plots the Fields index against the horizon over which the index is measured: 1-year mobility = 1; 2-year mobility = mobility index over a horizon of 2 years, span wave(1)-wave(2); 8-year mobility = mobility index over a horizon of 8 years, span(wave(1)-wave(8))
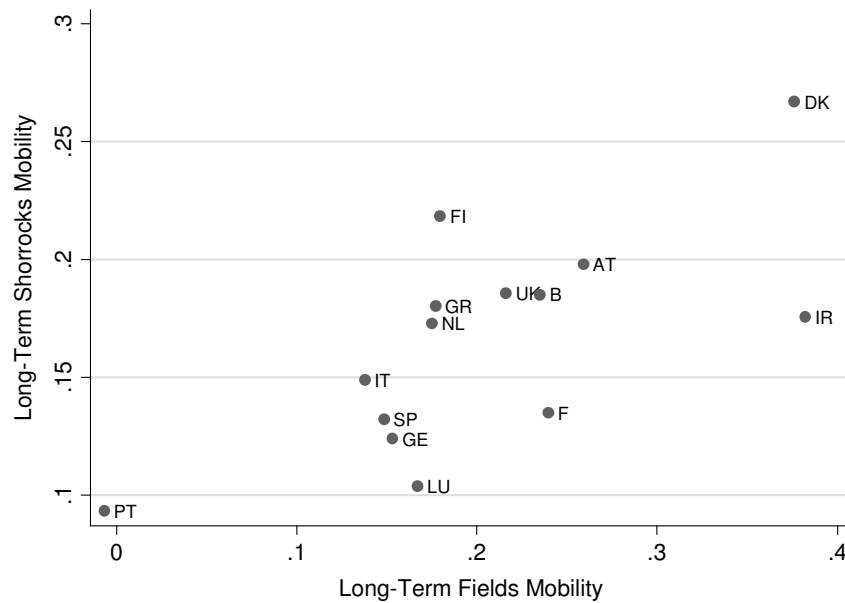
Figure 8. Scatter plot of long-term (6-year, 7-year and 8-year) mobility: Shorrocks vs. Fields

DNK	FIN	AUT	BEL	NLD	UK	IT	GE	LU	GR	IRL	FR	ESP	PRT

Low   High
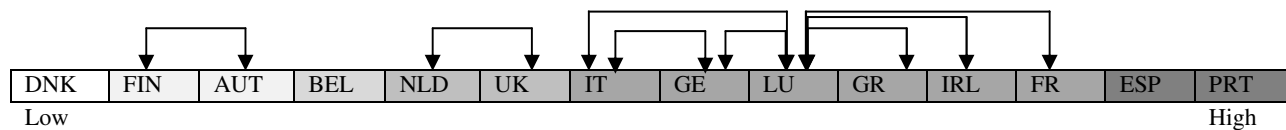
Diagram 1. Lifetime Earnings Inequality Ranking

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