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INCOME MOBILITY AND ECONOMIC INEQUALITY FROM A REGIONAL PERSPECTIVE

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A necessary condition for mobility to reduce the popular desire for redistribution is a significant positive correlation between inequality and mobility. In Prieto et al. (2008), a significant positive relationship was found at the national level. The objective of this study is to establish empirically whether such a relationship is maintained at the regional level. The indices are calculated for the set of EU regions using the European Community Household Panel survey. Total mobility is decomposed into three terms: growth, dispersion and exchange. We show that this positive relationship is robust by estimating a hierarchical linear model.

JEL classification codes: D31, D63, H24, J60
Key words: social mobility, inequality, income distribution

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I. Introduction

The recent literature establishes that the social demand for redistribution has two main determinants: social mobility and beliefs regarding whether income differences are due to effort or luck. Piketty (1996) finds that stronger beliefs that income differences are the result of luck together with lower social mobility increase the level of support for income redistribution. Ravallion and Lokshin (2000), Corneo and Gruner (2002) and Fong (2001) confirm these results: greater mobility reduces the popular desire for redistribution; and a firm belief that individual effort is the principal cause of income dispersion similarly produces a greater aversion to redistributive policies. In this context, Prieto et al. (2008) estimate the relationship between social mobility and income inequality for countries in the European Union. They find a significant positive relationship between both variables. Therefore, a necessary condition for social mobility to diminish the social predilection for redistribution is fulfilled.

In this paper, we contrast the relationship between inequality and mobility at the regional level. The advantages of this approach are the following. First, it allows us to contrast the sensitivity and robustness of Prieto et al.'s results. For this task, we use a more accurate definition of income and a hierarchical linear model which allows us to consider individual effects not only by country but also by region. Furthermore, we take the effect of each mobility component as the average effect over all possible decomposition sequences instead of just one decomposition sequence as in Prieto et al. (2008). Second, there is a large gain in sample size when the study is based on regional observations. If we study the relationship for 1-year, 3-year and 5-year mobility, we make use of 509, 359 and 209 observations (or regions) instead of 94, 66 and 33 observations (or countries), respectively. The increase in sample size guarantees a gain in the statistical significance of the results. Third, redistributive policies in the European Union (EU) are determined not only at the national level but also at the regional level. In fact, a mix of national and regional policies determines the degree of redistribution. Therefore, results at the regional level are also required to understand redistributive policies in Europe.

The source of the data used in this paper is the European Community Household Panel (hereafter ECHP), which has the significant advantage of being a homogeneous panel database; it thus permits a more rigorous analysis of income distribution in the various regions of the European Union.[1] We use the Theil 1 inequality index

[1] Many papers adopt a regional perspective to analyse income distribution, however they typically focus on just one of these variables. See Ezcurra et al. (2005) for inequality in the European Union, Dickey (2001) for income inequality in the UK and Salas (1999) for mobility in Spain.

(Theil, 1967) and the indices of social mobility proposed by Fields and Ok (1999) for the European regions. Moreover, total mobility is decomposed into three distinct terms: mobility due to economic growth, mobility produced by dispersion and exchange mobility resulting from reranking.[2] It is thus possible to determine which type of mobility is the most important factor when attempting to explain the relationship between inequality and social mobility. Furthermore, the mobility indices are calculated for periods of one, three and five years to contrast their robustness. These different time periods allow for an analysis of the sensitivity of the results, bearing in mind the various hypotheses that exist regarding mobility in the short, medium and long term. After computing all indices, a hierarchical linear model shows that a positive and significant relationship exists between mobility and income inequality at the regional level. This relationship corroborates the robustness of the link between greater social mobility and reduced demand for redistribution.

In the following section, various inequality and mobility indices employed in the current study are described, as is the decomposition of total mobility that is performed. In Section III, we comment on the database and notions of income inequality used in this article. Section IV presents the results, and finally, Section V provides the main conclusions of the study.

II. Mobility and income inequality indices

The literature has provided a substantial number of indices for the measurement of social mobility, including Shorrocks (1978a and 1978b), King (1983), Chakravarty et al. (1985), Cowell (1985), Dardanoni (1993) and Fields and Ok (1996 and 1999). Furthermore, several decompositions of mobility have been proposed (see, among others, Markandaya, 1982; Ruiz-Castillo, 2004, and Van Kerm, 2004). Concretely, social mobility may be decomposed into three different components: growth, dispersion and exchange. The first of these isolates the increase in the mean income of the distribution produced by economic growth. The dispersion component evaluates the degree to which income convergence occurs by studying the variation in the inequality of distribution without income being reranked. Finally, the exchange component shows the magnitude of the

[2] The first term isolates the increase in the mean income of the distribution produced by economic growth; the second term evaluates the variation in the inequality of distribution without income being reranked. Finally, the third term shows the magnitude of the rerankings among incomes.

rerankings among incomes. In this study, social mobility is decomposed into growth, dispersion and exchange terms.[3]

Let $X = (x_1,..., x_N)$ be the initial income distribution defined for N households. We shall define X^e as the vector of equivalent incomes, that is, monetary incomes divided by the equivalence scale e. Therefore, for example, for household i the equivalent income is defined as

$$x_i^e = \frac{x_i}{e(N_i)} \tag{1}$$

where N_i is the number of household members, and e is the equivalence scale, where $1 \leq e \leq N_i$. Let us adopt the parametric scale proposed in Buhmann et al. (1988) and Coulter et al. (1992):

$$e(N_i) = N_i^{\alpha},\ 0 \leq \alpha \leq 1. \tag{2}$$

As is usual in this literature (see for example OECD 2005 and Rodríguez et al. 2005), we let $\alpha = 0.5$. Moreover, we weight each household by the number of members in the household, following Ebert (1997 and 1998) and Ebert and Moyes (2000). We shall assume that the vector of equivalent incomes X^e is ranked in ascending order:

$$0 \leq x_1^e \leq x_2^e \leq ... \leq x_N^e \tag{3}$$

Consequently, we can evaluate the inequality index proposed in Theil (1967) in the initial period as:

$$T(X^e) = \frac{1}{N}\sum_{i=1}^{N}\frac{x_i^e}{\mu_X}\ln\frac{x_i^e}{\mu_X} \tag{4}$$

where μ_X is the mean of equivalent incomes in the initial period.

The final distribution of equivalent income is $Y^e = (y_1^e, y_2^e,..., y_N^e)$, where Y^e is ordered from lowest to highest. Therefore, the Theil 1 inequality index in the final period is:

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[3] Prieto et al. (2002) study the relationship between exchange mobility and inequality for the EU countries using a reranking index and a family of generalised Gini indices (see Donaldson and Weymark 1980 and 1983, and Yitzhaki 1983, respectively).

$$T(Y^e) = \frac{1}{N}\sum_{i=1}^{N}\frac{y_i^e}{\mu_Y}\ln\frac{y_i^e}{\mu_Y} \tag{5}$$

where μ_Y is the mean of equivalent incomes in the final period.

Mobility is measured using the approach proposed in Fields and Ok (1999), namely, the transformation $X^e \rightarrow Y^e$:

$$M(X^e, Y^e) = \frac{1}{N}\sum_{i=1}^{N}\left|\ln(y_i^e) - \ln(x_i^e)\right| \tag{6}$$

Total mobility is decomposed into three elements: mobility due to growth (M^G), mobility resulting from dispersion (M^D) and exchange mobility (M^E). To this end, we follow Van Kerm (2004) and define $G(X;X^1)$, $D(X;X^1)$ and $E(X;X^1)$ as three functions that, when applied to the income vector X with income vector X^1 used for calibration, generate growth, dispersion and exchange components, respectively. In particular, we consider the following transformation functions (see Van Kerm 2004):

$$G(X;X^1) = \frac{\mu^1}{\mu}X, \tag{7}$$

$$D(X;X^1) = \frac{\mu}{\mu^1}RX, \tag{8}$$

$$E(X;X^1) = PX, \tag{9}$$

where μ and μ^1 are the means of X and X^1, respectively, R is an $N \times N$ diagonal matrix with elements $X^1_{r(x_i)} / x_i \left(r\left(x_i\right) \text{ is the rank order of } x_i \text{ in vector } X\right)$, and P is a $N \times N$ permutation matrix that ranks the income vector X^1 in increasing order. The function G isolates the change in the mean income of X produced by economic growth, the function D evaluates the variation in the inequality of X without income being reranked, and the function E sorts the income vector X in the order of X^1. For example, if we apply the sequence growth-dispersion-exchange, we obtain the following components:

$$M^G(X^e, Y^e) = M(X^e, G(X^e; Y^e)), \tag{10}$$

$$M^D(X^e,Y^e) = M(X^e, D \circ G(X^e;Y^e)) - M(X^e, G(X^e;Y^e)), \tag{11}$$

$$M^E(X^e;Y^e) = M(X^e,Y^e) - M(X^e, D \circ G(X^e;Y^e)), \tag{12}$$

where $M(X^e,Y^e) = M^G + M^D + M^E$.

Unfortunately, this decomposition is sequential; that is, it depends on the sequence adopted to introduce the components. Therefore, the sequence growth-dispersion-exchange adopted in Prieto et al. (2008) is just one possibility among a total of 3! decompositions. To deal with a situation in which all sequences are equally relevant, we apply the Shapley value.[4] The procedure emerges from cooperative game theory, which considers the impact of eliminating each component in succession, and then averaging these effects over all sequences (Rongve 1995, Chantreuil and Trannoy 1999, Sastre and Trannoy 2002, Rodríguez 2004). This decomposition has the advantage of being exact and symmetric.

III. Database

The database used in this paper is the European Community Household Panel (ECHP). It is a homogeneous panel database that permits a rigorous analysis of income distribution in the various regions of the European Union-15. Indices for social mobility and inequality are computed for the 75 regions of the European Union in the period 1994-2001. Note that the data for Sweden in the ECHP are repeated cross-sections. Accordingly, we disregard the sample regions in Sweden. Regional divisions are based on a mix of NUT-0 (Denmark, the Netherlands and Luxemburg) and NUT-1 classifications.[5] The only exception is Portugal where regions are defined using the NUT-2 classification, as the NUT-1 division considers the continental territory as a whole. Furthermore, the city districts of Berlin, Bremen and Hamburg in Germany are aggregated together with the surrounding regions of Brandenburg, Niedersachsen and Schleswig-Holstein, respectively. As an illustration of our dataset, we display the sample size of households within each region for the fourth wave in the database (year 1997) in Table 1.

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[4] If the decomposition is hierarchical two variants of the Shapley value can be applied: the nested Shapley and the Owen value (Sastre and Trannoy 2002, Rodriguez 2004).

[5] The term NUT refers to the nomenclature of territorial units for statistics. It provides a single and coherent territorial breakdown for the compilation of EU regional statistics. A complete listing of the classification is available at http://ec.europa.eu/eurostat/ramon/nuts/codelist_en.cfm?list=nuts.

Table 1. Sample size of households by regions for year 1997

COUNTRY	REGION											
	1	2	3	4	5	6	7	8	9	10	11	12
The Netherlands	2,816											
Belgium	200	823	776									
Denmark	1,514											
France	611	767	260	385	624	479	458	459				
Ireland	1,041	327										
Italy	367	429	454	221	444	205	273	436	576	389	279	
Greece	1,129	893	635	407								
Spain	535	541	323	649	744	650	211					
Portugal	624	730	340	329	468	446	474					
Austria	811	485	655									
Finland	548	790	331	312	176							
Germany	508	537	368	273	134	352	799	366	223	136	237	224
Luxemburg	1,668											
United Kingdom	236	362	296	169	1,052	323	327	384	191	337		

Since the countries included in this database did not enter the panel at the same year, we have less than eight years of data for each region. However, a balanced panel within countries is used to guarantee the required observation persistence. Moreover, the income concept used in this study is the “current household income”. Other studies have considered the “annual total income in the preceding calendar year”; however, changes in household structure during the previous calendar year and between the previous calendar year and the interview date often lead to measurement errors that specifically affect measures of income mobility (Debels and Vandecasteele 2008). For this reason, we do not use the same income variable used in Prieto et al. (2008) at the country level. Finally, a biased estimation of inequality and mobility indices due to extreme data is avoided by dropping negative and zero incomes.[6]

IV. Estimation results

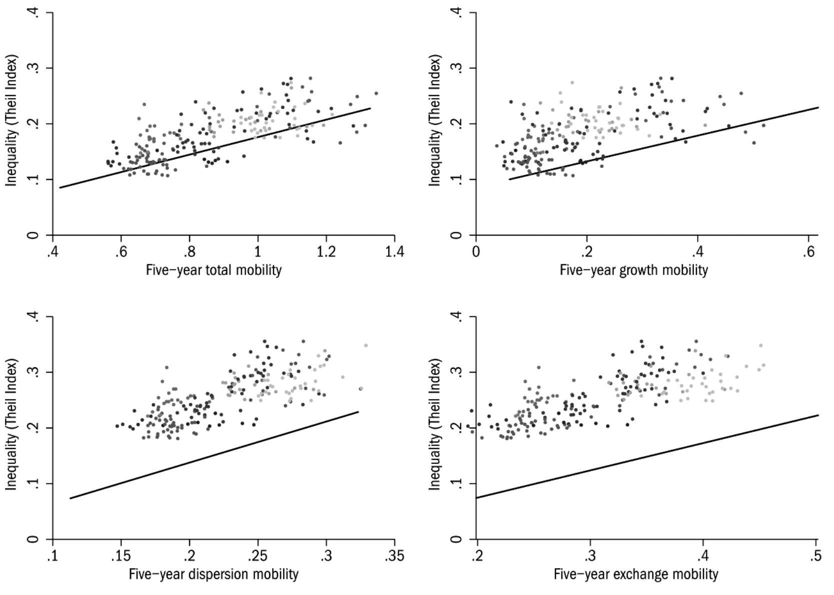
Figure 1 shows the indices for five-year mobility and inequality for all panel years and all mobility concepts for the EU regions as a whole. A clear and positive correlation can be observed between the indices of social mobility and the inequality of income distribution. In fact, the pooled ordinary least squares estimation for total mobility presents an R^2 equal to 0.50.

A preliminary analysis shows that the observations are apparently grouped by countries and/or regions, which indicates that there exist individual effects in the relationship between social mobility and income inequality. The influence of institutional factors seems sufficiently important in the short term to avoid strong variations in the mobility and inequality indices of a particular region. Accordingly, we control for individual effects not only at the regional level but also at the country level. To this end, we estimate a hierarchical linear model (Cameron and Trivedi 2009), as the data have two nested groups: countries and regions. The hierarchical linear model can be written as follows:

$$T_{ijt} = c + M_{ijt}\beta_j + u_j + v_{it} + \varepsilon_{ijt}, \tag{13}$$

[6] Since particularly high income values could lead to both inequality and mobility measures being arbitrarily large, we have also estimated the inequality and mobility indices trimming the top 1% of the data. The results were similar (they are shown in the Appendix); therefore the estimates in Section IV can be considered robust.

Figure 1. Inequality (Theil index) vs mobility (Fields and Ok index)



where M is a mobility index, T is an inequality index, c is an intercept, and the subscripts i, j and t represent the country, region and time period under consideration, respectively. Note that u_j denotes the unobservable regional specific effect, while v_{it} denotes the unobservable structural effect (i.e., country- and time-specific effects). By applying this hierarchical linear model we first specify a random intercept for each country, controlling for the business cycle by including time effects, i.e., we assume that the cycle effect may vary across countries. Then, a random intercept and slope for each region are included. In this manner, not only specific regional effects (that shift the relation up and downwards) may exist but also the slope that leads the relationship between inequality and mobility may be different for each region.

The hierarchical linear model can be estimated by Feasible Generalized Least Squares, so its estimates are more efficient. However, before implementing this estimation, we apply the likelihood test for the null hypothesis that the parameters are constant. Given the estimated models, the statistic is distributed according to a χ^2 with 4 degrees of freedom. The critical values for $p = 0.01$ and $p = 0.05$ are 13.28 and 9.49, respectively. Therefore, we clearly reject the null hypothesis in all cases (see Table 2), and we estimate a hierarchical linear model. Moreover, the global significance of the regressors is contrasted by Wald's test which is distributed according to a χ^2 with k degrees of freedom, where k is the number of parameters minus 1.

Inequality as measured by the Theil 1 index has a significant positive relationship with total mobility for one year. In particular, the positive coefficient for income mobility (0.06473) is significant. Greater mobility within the set of European regions has produced an increase in inequality among them. Furthermore, this relationship is not dependent upon the time period under consideration. That is, the correlation remains positive and significant when the explanatory variable of mobility is analyzed at three or five years; the coefficients are 0.03714 and 0.10361, respectively. In fact, the greatest positive coefficient for mobility is achieved in the long-run.

To examine the factors explaining this positive correlation, we also present in Table 2 the results produced by regressing inequality on the various components of total mobility. Note that after controlling for cycle, country and region effects, the results for growth mobility show that there exists a negative and significant relationship between inequality and the growth mobility index. The coefficients for growth mobility at 1, 3 and 5 years are -0.09431, -0.14805 and -0.04484, respectively. Therefore, growth is not the factor that accounts for the positive relationship. Besides, this negative relationship declines in the long-run. Inequality is positively related with the dispersion mobility component. In fact, the positive and significant coefficient of the explanatory variable (0.44619, 0.50897 and 0.5713 at 1, 3 and 5 years, respectively) increases over time. Finally, there is a significantly positive relationship when the explanatory variable is exchange mobility for all periods. The estimated coefficients are 0.30672, 0.39467 and 0.45108 at 1, 3 and 5 years, respectively. We see that the estimated coefficients are lower than those for the dispersion term of mobility.

It is thus shown, on the one hand, that the explanatory power of the growth factor is not statistically significant and, on the other hand, that the dispersion and exchange components explain the positive association of total mobility with inequality. Nevertheless, the coefficients of the dispersion mobility component show the greatest magnitude. As expected, these estimations are more significant than the results in Prieto et al. (2008). In particular, some variables are now statistically significant, for example, the growth mobility variable in the 1-year and 3-year regressions and the exchange mobility variable in the 5-year regression.

Our analysis has considered only one particular inequality index, the so-called Theil 1 index. Other inequality measures, such as the Gini index, the Atkinson index or General Entropy measures could be used to check the robustness of our results.

Table 2. Hierarchical linear models by region: panel EU-15, 1994-2001

Dependent variable: Theil inequality index	1-year mobility	3-year mobility	5-year mobility
Constant	0.11364***	0.1205***	0.05895***
	(0.00942)	(0.01162)	(0.01419)
M	0.06473***	0.03714**	0.10361***
	(0.01756)	(0.01579)	(0.01794)
Standard deviation of random intercept by country and wave	0.01056	0.01099	0.02252
	(0.00156)	(0.00233)	(0.00419)
Standard deviation of random parameter M by region	0.06474	0.05028	0.04445
	(0.01845)	(0.01840)	(0.02394)
Standard deviation of random intercept by region	0.05479	0.05954	0.03205
	(0.00884)	(0.01098)	(0.02096)
Wald's test	13.581	5.532	33.340
Likelihood test of parameter constancy	443.353	205.733	89.672
Constant	0.14507***	0.15873***	0.14642***
	(0.00579)	(0.00625)	(0.01138)
M^G	-0.09431***	-0.14805***	-0.04484
	(0.03402)	(0.02461)	(0.03675)
Standard deviation of random intercept by country and wave	0.01060	0.00991	0.04174
	(0.00146)	(0.00181)	(0.00828)
Standard deviation of random parameter M^G by region	0.14208	0.08393	0.13120
	(0.02792)	(0.02775)	(0.03789)
Standard deviation of random intercept by region	0.04628	0.04478	0.03460
	(0.00445)	(0.00521)	(0.00999)
Wald's test	7.685	36.189	1.488
Test of parameter constancy	587.337	363.438	144.128
Constant	0.07777***	0.05192***	0.02348
	(0.00929)	(0.01165)	(0.01483)
M^D	0.44619***	0.50897***	0.5713***
	(0.05382)	(0.05696)	(0.07284)
Standard deviation of random intercept by country and wave	0.00998	0.01134	0.02231
	(0.00151)	(0.00256)	(0.00384)
Standard deviation of random parameter M^D by region	0.19303	0.18765	0.21381
	(0.05503)	(0.05496)	(0.08958)
Standard deviation of random intercept by region	0.05199	0.05450	0.03763
	(0.00876)	(0.01102)	(0.01923)
Wald's test	68.722	79.842	61.519
Test of parameter constancy	473.619	203.987	108.204

Table 2 (continued). Hierarchical linear models by region: panel EU-15, 1994-2001

Dependent variable: Theil inequality index	1-year mobility	3-year mobility	5-year mobility
Constant	0.07013***	0.02503**	-0.0102
	(0.01038)	(0.01264)	(0.01533)
M^E	0.30672***	0.39467***	0.45108***
	(0.03620)	(0.03869)	(0.04549)
Standard deviation of random intercept by country and wave	0.01112	0.01303	0.02049
	(0.00160)	(0.00320)	(0.00355)
Standard deviation of random parameter M^E by region	0.08103	0.05679	0.03792
	(0.03635)	(0.04208)	(0.03373)
Standard deviation of random intercept by region	0.05189	0.04121)	0.00359
	(0.00913)	(0.01388)	(0.01134)
Wald's test	71.783	104.078	98.317
Test of parameter constancy	483.570	226.565	115.955
N	509	359	209
Number of groups (*m*)	75	75	75

Notes: M: total mobility M^G: growth mobility M^D: dispersion mobility M^E: exchange mobility. ***: significant at the 1% level. **: significant at the 5% level. *: significant at the 10% level. Standard deviations in parentheses. Regions are EU-15 but Sweden.

For this task, we estimate the correlation matrix of the Gini coefficient, the Atkinson 0.5 and 1 indices, and the Theil 0 and 1 indices. Table 3 shows that the correlation between these inequality indices is high. The lowest correlation is 0.92, and corresponds to the correlation between the Gini and Theil 1 indices. Consequently, we can be assured with little margin of error that our results also hold for alternative inequality measures.

Finally, we provide one possible explanation of our results: because increased social mobility produces a greater change in the relative position of individuals, inequality is seen as being less unacceptable. An individual may earn less than the average income prevailing in his/her economy today, but tomorrow this person may earn more. If social mobility is sufficiently high, the concerns produced by inequality may decrease, thereby reducing the demand for redistribution. This decreased social pressure for redistribution would, in the end, result in a greater inequality of final income. Therefore, social mobility and redistribution would be negatively correlated; no exchange occurs between these two variables. Moreover, the presence of observations grouped by countries suggests that given a set of economic restrictions, social preferences determine the combination of income dispersion and social mobility in each country.

Table 3. Correlation matrix of inequality indices

	Gini	Theil 0	Theil 1	Atkinson 0.5	Atkinson 1
Gini	1				
Theil 0	0.9885	1			
Theil 1	0.9232	0.9463	1		
Atkinson 0.5	0.9781	0.9907	0.9802	1	
Atkinson 1	0.9914	0.9995	0.9414	0.9889	1

V. Conclusions

To analyze the relationship between income and social mobility from a regional perspective, this study provides empirical evidence of the positive relationship between these two variables. Greater social mobility makes greater inequality index values more tolerable. The result found in Prieto et al. (2008) is thus confirmed at the regional level. However, the significance of Prieto et al.'s results is improved by our estimations, which use a much larger number of observations. Moreover, our analysis points out that the common practice of basing the study of mobility exclusively upon indices of reranking might bias the results under certain circumstances.

Appendix

Table A1. Hierarchical linear models by region (top 1% censored)

Dependent variable: Theil inequality index	1-year mobility	3-year mobility	5-year mobility
Constant	0.09014***	0.08171***	0.04454***
	(0.00660)	(0.00814)	(0.00985)
M	0.06640***	0.05851***	0.09551***
	(0.01194)	(0.01259)	(0.01359)
Standard deviation of random intercept by country and wave	0.00458	0.00465	0.01789
	(0.00071)	(0.00098)	(0.00307)
Standard deviation of random parameter M by region	0.04785	0.05264	0.03414
	(0.01378)	(0.01328)	(0.00983)
Standard deviation of random intercept by region	0.04355	0.04360	0.01092
	(0.00589)	(0.00844)	(0.00673)
Wald's test	30.896	21.578	49.389
Likelihood test of parameter constancy	703.021	342.481	150.712
Constant	0.11745***	0.11813***	0.10908***
	(0.00450)	(0.00480)	(0.00840)
M^G	-0.03497	-0.02587	0.03514
	(0.02318)	(0.02103)	(0.02906)
Standard deviation of random intercept by country and wave	0.00494	0.00545	0.02586
	(0.00073)	(0.00098)	(0.00517)
Standard deviation of random parameter M^G by region	0.08720	0.09263	0.13053
	(0.02429)	(0.01949)	(0.02755)
Standard deviation of random intercept by region	0.03746	0.03541	0.03594
	(0.00332)	(0.00384)	(0.00702)
Wald's test	2.276	1.513	1.463
Test of parameter constancy	868.037	480.731	194.782
Constant	0.06809***	0.04874***	0.01948*
	(0.00655)	(0.00735)	(0.01075)
M^D	0.36720***	0.39158***	0.50152***
	(0.03861)	(0.04476)	(0.05702)
Standard deviation of random intercept by country and wave	0.00408	0.00301	0.01822
	(0.00067)	(0.00096)	(0.00296)
Standard deviation of random parameter M^D by region	0.14275	0.13569	0.19738
	(0.04639)	(0.07208)	(0.06459)
Standard deviation of random intercept by region	0.04044	0.02205	0.02899
	(0.00579)	(0.01442)	(0.01396)
Wald's test	90.44	76.526	77.368
Test of parameter constancy	763.237	368.372	163.468

Table A1 (continued). Hierarchical linear models by region (top 1% censored)

Dependent variable: Theil inequality index	1-year mobility	3-year mobility	5-year mobility
Constant	0.06883***	0.03749***	0.00113
	(0.00693)	(0.00801)	(0.01095)
M^E	0.21431***	0.27313***	0.35789***
	(0.02410)	(0.02727)	(0.03474)
Standard deviation of random intercept by country and wave	0.00446	0.00378	0.01735
	(0.00069)	(0.00092)	(0.00271)
Standard deviation of random parameter M^E by region	0.08650	0.02354	0.09673
	(0.02950)	(0.02692)	(0.02401)
Standard deviation of random intercept by region	0.04225	0.01871	0.02051
	(0.00597)	(0.00761)	(0.00740)
Wald's test	79.107	100.328	106.146
Test of parameter constancy	760.374	361.402	172.301
N	509	359	209
Number of groups (*m*)	75	75	75

Notes: M: total mobility; M^G: growth mobility; M^D: dispersion mobility; M^E: exchange mobility. ***: significant at the 1% level. **: significant at the 5% level. *: significant at the 10% level. Standard deviations in parentheses. Regions are EU-15 but Sweden.

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