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**Inequality of Personal Income in the Enlarged EU:  
The Role of the Welfare States, Regional Cohesion Policies  
and Economic Integration**

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**Inequality of Personal Income in the Enlarged EU:  
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**Abstract:**

This study examines how the distribution of income across persons, regions, countries and larger geographical areas in the EU has changed in the dawn of the enlargement of the EU. It focuses especially on the effects of trade liberalization, the welfare states and the regional cohesion policy implemented at the European level. Moreover, it assesses the ‘statistical’ effect resulting from the enlargement of the community of people for which inequality is to be measured.

A three-level spatial decomposition of personal inequality reveals that a fifth of the overall interpersonal inequality in the EU is attributed to the East-West income gap and that intra-regional inequality accounts for three quarters of the overall inequality. Within-country personal inequality shows a clear convergence throughout the member states: Inequality is rising in the Scandinavian social-democratic welfare states and decreasing in the liberal and Mediterranean countries. In Central Eastern Europe, the rapid growth of inequality which had been observable during the first years of transition has come to an end.

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## **1. Introduction**

The distribution of personal income in the EU is shaped by an interplay of institutions at the national and European level. The member states' tax and transfer systems redistribute income among citizens within the national borders, while the social cohesion policy implemented by the EU provides financial support for regions and countries in which the GDP per-capita income lags behind the EU average. One major aim of the study at hand is to assess the roles the different institutions play, and can theoretically play, in reducing the inequality of income across European citizens. It therefore touches on the spatial structure of inequality: It makes a difference to the efficiency of the various policy measures, whether the inequality between persons is predominantly due to regional disparities or to differences in income among persons living in the same territorial units

The size of regional disparities in the EU has dramatically changed as a consequence of the eastward enlargement of the Union, the preparation for which has brought about far reaching institutional change. The enlargement has influenced the distribution of income in different ways. First, a new group of people, most of them earning an income far below the EU average, has joined the community of European citizens and, accordingly, the inequality of personal income reported for this larger community has increased. Second, long before the formal accession of eight Central Eastern European (CEE) countries in May 2004 a number of measures were taken to prepare these countries' integration into the single market of the EU. Institutional barriers on trade and capital flows were removed and many rules established in the EU15 have been extended to the candidate countries. To find out, in which way these preparatory steps have shaped the distribution of income in both parts of Europe, is another research goal of this paper.

The study analyses inequality occurring across all citizens of the EU, not across inhabitants of single countries. This is in contrast to the approaches employed in most previous comparative studies about inequality in Western and Eastern Europe (Atkinson et al. 1995; Smeeding 2000; Gottschalk and Smeeding 1997; Milanovic 1999) and incorporated in the definition of the Laeken indicators, the official EU indicators of social exclusion published by Eurostat.<sup>1</sup> Beblo's and Knaus' (2001) study is the only example I know, in which the income differences between citizens of different EU member states enter into a single supra-national inequality measure. However, as it covers only the 12 countries of the Eurozone it does not take into account the inequality produced by the huge welfare gap between the EU15 and the accession countries.

Country-wise measurement of income inequality is often justified with the theory of relative deprivation, which rests on the assumption that a persons' well-being is predominantly determined by their social status relative to the other members of the community, rather than by the absolute value of resources they earn. Poor persons living in a poor country are assumed to suffer less from their low income than persons earning the same amount of income in a rich country. Different arguments in favour of this assumption have been developed. First, the feeling of being deprived is often caused simply by the fact that people realize that other community members are better off than themselves, regardless of the absolute income level (Runcimann 1966). Second, the perception of what is understood as a life of dignity typically differs between richer and poorer communities (Townsend 1979). Finally, the means guaranteeing a given living standard are more difficult to achieve in richer than in poorer countries (Sen 1983).

In this line of thought deprivation becomes a matter of culture and identity. Of course, European citizens still feel deeply rooted in their national and regional environments (Keating 1998; Edwards 2000; Castells 2002). However, the dense network of trans-national institutions, increased information flow and geographical migration have seemingly induced ‘international socialisation’ and the emergence of a common European identity, at least as a complement to national or regional identities (Zürn and Checkel 2005; Wintle 2000). This is well confirmed by Niedermayer’s (1995) and Delhey’s (2005) research on interpersonal trust between citizens of different member states, the main determinant of sense of community according to Karl Deutsch. Furthermore, Süßner’s (2002) case studies on regional cultures and identities, Hooghe’s (2005), Beyers’ (2005) and Lewis’ (2005) surveys of officials working in European institutions and Risse’s (2001) discourse analysis of political parties find evidence for socialisation induced by European trans-national institutions. In the light of this development, the arguments presented above lose their strength to justify a country-wise measurement of inequality in the EU: More and more people compare their social status with the status of other member states’ inhabitants; people in Europe increasingly develop common perceptions to be used as the basis for the evaluation of one’s standard of living; finally, as differences in cultural norms, prices and institutional rules disappear, the means to achieve a given standard of living will not differ as much from country to country as they did in the past.<sup>2</sup> Besides, the emergence of a European identity itself is dependent on the degree to which European citizens feel they belong to a common European welfare state and to what extent common measures are applied for the identification of deprivation (cf. Opielka 2006).

Against the background of these considerations, the study at hand compares the income across persons living in 15 member states of the EU. It analyses how much of this inequality is attributed to inequality within regions, countries and larger geographical areas and how much to differences between these geographical units. Splitting up the inequality into its within-country and between-country components allows us to assess the efficiency and the potential of redistributive policies conducted at the national level and of social cohesion policies conducted at the supra-national level. By separating the inequality within the EU15 and CEE from the inequality between them, important conclusions about the effect of the EU enlargement on the personal inequality of income can be drawn. These effects include both the effect of the preparatory steps for the extension of the Single Market to CEE as well as the effect of broadening the community of people throughout which the inequality of income is to be measured.

I will proceed by first describing the institutional environment of the 1990s (section 2) and the development of the personal income distribution in Europe during the first half of that decade, as it is reported by previous studies undertaken in this field (section 3). In section 4, I will present the data I use and explain the way I manipulate the observed household income to make it comparable across persons, countries and time periods. Furthermore, I will introduce the inequality measure employed in this study, the mean logarithmic deviation, and show how the overall inequality, expressed in terms of this measure, can be additively decomposed at three geographical levels (NUTS1-regions, countries, and EU15/CEE). The results will be presented in section 5. Section 6 will conclude.

## **2. The Institutional Environment in the 1990s**

In the beginning of the 1990s, the income distribution throughout Europe reflected the different political regimes that had been governing in the east and west of the continent.

### *2.1. Economic Transition in Central Eastern Europe*

The equalization of earnings had been a constituent component of the political doctrine in the CEE countries in socialist times. Later, the transition from planned to market economies created the preconditions for greater diversification of personal income. The employees' wages and pensions became increasingly determined by the demand and supply on the labour market allowing a greater dispersion of wages across professions and branches than before. Increasing unemployment led to the emergence of a broad stratum of society earning an income far below the average. Moreover, the proportion of those labour market segments within which income was most unequally distributed grew: the sector of the self-employed and the private economy (Milanovic 1999: 300-304).

At around the same time, the price regulations and subventions, which in socialist times had guaranteed that everybody could afford the basic needs, were removed. These reforms combined with the increasing number of people earning very low income produced an urgent need for the foundation of new social assistance schemes. Such schemes, most often publicly financed, were built up in the CEE countries between 1990 and 1993. Their design differs considerably. Social assistance in Poland and Estonia, for example, is concentrated on a relatively small number of people in urgent need, whereas in Hungary it reaches a larger part of the population as a consequence of the numerous different schemes persons can apply for. According to Adema and Ladaique (2005), social assis-

tance schemes in CEE countries generally lack the financial resources necessary to effectively avoid poverty. The high proportion of informal earnings and the fact that incomes are clustered around the poverty threshold make it difficult to conduct a means-tested social assistance policy (cf. Chu and Gupta 1998; Milanovic 2000).

## *2.2. Different Welfare Regimes in Western Europe*

In Western Europe, where the tax and transfer systems have a much longer history, the income distribution is shaped to a considerable degree by the type of welfare state. The Nordic welfare states in Scandinavia have a strong egalitarian tradition putting an emphasis on guaranteeing universal social rights to all of their citizens. In the Continental (West-)European states the tax and transfer systems show a strong orientation towards traditional values of the family, and eligibility for social assistance is highly dependent on the persons' occupational status. The Britain welfare states (Great Britain and Ireland) are characterized by means-tested social assistance focusing on the avoidance of bare poverty. Public transfers guarantee only the most basic support, and a high proportion of the assistance is provided by private schemes. In the Mediterranean countries, the formal institutions of social assistance are rather poorly developed. The most important institution for social protection is still the family, and the transfer intensity is almost as low as in CEE (Esping-Andersen 1990 and 2002; Klammer 2000; Hicks and Kenworthy 2003; Adema and Ladaique 2005, Busch 2000).

As capital mobility has increased over the last decades both within Europe and across the world, mobile workers and capital respond more sensitively than ever before to changes in the rules of tax and transfer system by moving from one region to another. Consequently, governments come under increasing pressure to reduce taxes on mobile

factors of production (including the workers' human capital) and the scope for redistribution of income within a country narrows (Wildasin 1992 and 1991; Apolte 2001).<sup>3</sup> For this reason, economic integration in Europe is often expected to lead to a convergence of national social assistance regimes towards a liberalised system (Busch 2000).

### *2.3. European Regional Cohesion Policy*

While the avoidance of too high inequality between the citizens of a country falls almost exclusively into the domain of the member states' social policy, important measures have been taken on the EU level to equalize regional per-capita income levels throughout Europe. At present, almost a third of the entire EU budget is spent on the cohesion fund and the structural funds. The means from the cohesion fund, which was established through the Maastricht Treaty in 1992, are spent on the improvement of the infrastructure and environmental conditions in the member states in which the GDP per capita is lower than 90 percent of the EU average. The structural funds predominantly support for regions with per-capita incomes below 75 percent of the EU average or heavily affected by social and economic restructuring and sluggish infrastructure. Before 2004, the resources of the structural funds were spent exclusively on regions and countries of the EU15. Some support, though to a much lesser extent, was also provided for the candidate countries, on the basis of the Phare program, with the aim to assist them in their efforts to prepare for the accession to the EU.<sup>4</sup>

### *2.4. Integration of Central Eastern Europe into the Single Market*

In addition to the redistributive and social cohesion policies reviewed so far, the distribution of income in Europe has probably also been shaped by the economic integration be-

tween the central eastern and the western part of the continent in the aftermath of the fall of the iron curtain. As early as in the beginning of the 1990s, the EU concluded agreements on trade liberalization and association treaties with each of the candidate countries, which laid the basis for the removal of trade barriers, the deregulation of international capital flows and the harmonization of norms regulating economic transactions (cf. Kamm 1996; Dicke and Foders 2000: 95-99; Kaminski 1999). As a consequence, the foreign trade between the EU15 and the CEE considerably increased in the course of the 1990s. Between 1993 and 2000 the share of imports into the Eurozone coming from Poland, Hungary and the Czech Republic rose from 3.7 to 5.9 percent and the share of exports delivered into these countries from 4.4 to 7.3 percent (Eurostat).

Some basic implications for the development of the distribution of income can be derived from standard international trade theory. The Heckscher and Ohlin Model predicts a convergence of regional per-capita incomes when trade barriers are removed, because the trading countries' economies specialize in those goods for the production of which they have a comparative advantage (factor price equalization theorem). As a consequence, the demand for the relatively affluent factors of production increases (and their prices rise), and the demand for the relatively scarce factors reduces (and their prices fall). Given the higher labour productivity in the EU15,<sup>5</sup> this area has most likely been specializing in the production of labour intensive goods leading to rising market wages among the high-skilled and decreasing market wages among the low-skilled workers. At the same time, the CEE countries should have been concentrating on the production of labour extensive goods, thereby raising the market-wages of the low-skilled and reducing those of the high-skilled workers. Hence, it can be expected that the inequality of per-

sonal income has risen in Western Europe in the course of the 1990s, while in CEE the income distribution should have become more equal.

### **3. Evidence from Previous Studies**

Studies by Atkinson et al. (1995), Smeeding (2000) and Beblo and Knaus (2001) confirm the strong impact the type of welfare state has on the distribution of disposable income. They find that the ranking of within-country income inequality of EU15 countries is clustered and that the clusters closely correspond to Esping-Andersen's typology of welfare states. Income is most equally distributed in the Nordic welfare states. More inequality can be found in most of the Continental welfare states, and the inequality appears to be highest in the Britain and the Mediterranean states.<sup>6</sup> Smeeding (2000) reports rising inequality of income in almost all investigated EU15 countries from the late 1980s to the mid 1990s. Only in Luxembourg did the inequality decline during this time. In CEE, the inequality grew in all the countries investigated by Milanovic (1999) although different paths of development are observable there. Slovenia, Hungary, Latvia and Poland entered the period of economic transition with comparatively low inequality at the end of the 1980s. Until the mid 1990s, the Gini coefficient of disposable incomes dramatically increased in Latvia (by 44 percent) and Poland (42 percent), whereas in Slovenia (13 percent) and Hungary (11 percent) the growth of inequality was not as high (Milanovic 1999).

The development of the regional and national average income levels, measured in terms of the GDP per-capita (adjusted by purchasing power parities), is well documented in the Cohesion Reports of the European Commission (2001 and 2004). As a general trend, the differences in the national average GDP per capita across the EU15 countries

diminished in the course of the 1990s. From 1989 to 1999, the gap between the GDP per capita in Greece, Spain and Portugal, three of the four previously least developed countries in the EU15, was reduced by a third, and the GDP per capita in Ireland rose from 64 to as much as 114 percent of the EU15 average. In the poorest ten percent of the NUTS2 regions, the GDP per capita grew from 55 to 60 percent of the EU15 average (European Commission 2001: 4-6).

Large income differences in the average GDP levels persist between the CEE and the EU15. With the exception of Cyprus, none of the countries which joined the Union in May 2004 is more prosperous than the poorest EU15 country. Only in Malta, Cyprus, the Czech Republic and Slovenia the GDP per capita was higher than 60 percent of the EU15 average in 2002. In Poland, Estonia and Lithuania it amounted to 40 percent, and in Latvia less than 35 percent of the EU15 average. As a consequence, the regional disparities within the EU have grown considerably after the enlargement. The gap between the GDP per capita in the least prosperous member state and the EU average has increased from less than 30 percent to more than 60 percent. 92 percent of the accession countries' population live in regions in which the GDP per capita is below 75 percent of the EU25 average. Two thirds live in regions with a GDP per capita of less than 50 percent of the average (European Commission 2004: ix, 10-12). However, the welfare gap between the East and the West EU has become smaller over time. Since the middle of the 1990s, the average annual growth of the GDP per capita has been 1.5 percentage points higher in CEE than in the EU15 (European Commission 2004: 4-9), and the difference between the average GDP per capita in CEE and the EU25 average has decreased from 54 percent to 48

percent of the EU25 average between 1995 and 2003 (Eurostat, Newchronos Database, cf. Hoffmeister 2006)

To summarize, we can infer from previous studies that, during the first half of the 1990s,

- the income distribution became more unequal in CEE countries, most obviously as a result of the fundamental economic restructuring in the course of the transition from a planned to a market economy,
- the income distribution in EU15 countries became more unequal, which can be explained by patterns of specialisation arising from international trade liberalisation and by a higher factor mobility limiting the governments resources to redistribute income from the rich to the poor,
- within the EU15, the countries' average income converged, probably as a result of the European regional cohesion policies,

Moreover, the huge income gap between the EU15 and CEE countries narrowed in the course of the 1990s, as could be expected considering the efficiency gains resulting from economic restructuring in CEE and the liberalisation of international trade between both parts of Europe.

The size of supra-national personal inequality in western Europe in 1995 has been investigated by Beblo and Knaus (2001). The Theil index they calculated for the twelve countries of the Eurozone came to 0.185. 9.3 percent of this amount stems from between-country inequality. In contrast to Beblo's and Knaus' analysis, the study at hand focuses on the inequality measured not only in western but also in central eastern European countries, thereby allowing an assessment of the impact of the huge welfare gap between

those two parts of Europe on the overall inequality of the EU25. Moreover, in contrast to Beblo's and Knaus' analysis, the inequality will be decomposed not only into component countries, but also more broadly and more narrowly confined geographical units.

## **4. Methodology**

### *4.1. Data*

The Luxembourg Income Study (LIS) makes available data on private households' income collected in large representative interview surveys in many European and non-European countries and thus offers unique opportunities for cross-country studies on personal income inequality. On the basis of the surveyed information about the gross income households received from various sources, about the tax payments, social security contributions and other deductions from income, the team of the LIS has generated a harmonized variable of household disposable income indicating the part of the income that households can use for consumption. I transformed household income into personal income by dividing its amount through the square root of the household size in order to take into account the reduction in cost of living which people achieve when they share a common habitation.<sup>7</sup>

The data is collected from surveys undertaken in different countries and different years. For the comparison of income across countries and time, the differences in the cost of living have to be taken into account. For that purpose, the household disposable income, which in the LIS is stored in local currency units at current prices, is deflated by inter-temporal price indices to the base year 2000 and transformed into European purchasing power standards (PPS) referring to that year.<sup>8</sup> One unit PPS can be thought of as

the cost of an average consumption basket equivalent to 1.1 Euros spent in Germany. The data of the regional and temporal price deflators have been taken from Eurostat's Ameco Database (see table A1 in the Annex).

### *3.2. Inequality Measurement*

Theil's (1967) Generalized Entropy Indices have been proven to be the only (differentiable, symmetric and homogenous) inequality measures that can be additively decomposed into subgroups (Bourgignon 1979, Cowell 1980 and Shorrocks 1980). One indicator belonging to this family is the Mean Logarithmic Deviation (MLD) which is defined as

$$D = \frac{1}{N} \sum_{i=1}^N \ln \left( \frac{\mu}{y_i} \right), \quad (1)$$

where  $y_i$  is the  $i$ -th person's income,  $\mu$  is the mean of income calculated over all  $N$  persons. The MLD can thus be interpreted as the average of logarithmic distances of individual income levels from the mean. Besides the additive decomposability, the MLD has two further properties most valuable for the analysis at hand: First, it is invariant to changes in scale, which means that its value does not change when everybody's income is multiplied by the same factor, like for example by inflation rates. Second, it follows the principle of diminishing transfers, implying that it reports diminishing inequality whenever a unit income is transferred from a richer to a poorer person.

### 4.3. Spatial Decomposition of Inequality

Assuming that  $N$  persons are distributed over  $K$  geographical areas  $k$  (like the EU15 and CEE), each of which has  $n_k$  inhabitants, formula (1) can be rewritten as

$$D = \frac{1}{N} \sum_{k=1}^K \sum_{i=1}^{n_k} \ln \left( \frac{\mu}{y_{k,i}} \right) \\ = \left[ \sum_{k=1}^K \frac{n_k}{N} \frac{1}{n_k} \sum_{i=1}^{n_k} \ln \left( \frac{\mu_k}{y_{k,i}} \right) \right] + \sum_{k=1}^K \frac{n_k}{N} \ln \left( \frac{\mu}{\mu_k} \right), \text{ with } \mu_k = \frac{1}{n_k} \sum_{i=1}^{n_k} y_{k,i}. \quad (2)$$

Each summand within the brackets is an MLD measuring the inequality within an area multiplied by that area's population share. The term right of the brackets is an MLD measuring the inequality between the areas' average income levels. In the following, the former indicators will be called within-area MLDs ( $D_k$ ), the latter one the between-area MLD ( $D^B$ ). Accordingly, defining

$$D_k = \frac{1}{n_k} \sum_{i=1}^{n_k} \ln \left( \frac{\mu_k}{y_{k,i}} \right), \quad D^B = \sum_{k=1}^K \frac{n_k}{N} \ln \left( \frac{\mu}{\mu_k} \right),$$

formula (2) can be rewritten as

$$D = \left[ \sum_{l=1}^{L_k} \frac{n_{k,l}}{n_k} D_{k,l} \right] + D^B. \quad (3)$$

Assuming that each geographical area  $k$  includes  $L_k$  countries  $l$ , the within-area MLD ( $D_k$ ) itself can be decomposed:

$$D_k = \left[ \sum_{l=1}^{L_k} \frac{n_{k,l}}{n_k} D_{k,l} \right] + D_k^B. \quad (4)$$

Assuming further that each country  $l$  of the area  $k$  consists of  $M_{k,l}$  regions  $m$ , then the within-country MLDs ( $D_{k,l}$ ) can be decomposed into

$$D_{k,l} = \left[ \sum_{m=1}^{M_{k,l}} \frac{n_{k,l,m}}{n_{k,l}} D_{k,l,m} \right] + D_{k,l}^B \quad (5)$$

Putting (5) into (4) and then (4) into (3) leads

$$D = \left[ \sum_{k=1}^K \sum_{l=1}^{L_k} \sum_{m=1}^{M_{k,l}} \frac{n_{k,l,m}}{N} D_{k,l,m} \right] + \left[ \sum_{k=1}^K \sum_{l=1}^{L_k} \frac{n_{k,l}}{N} D_{k,l}^B \right] + \left[ \sum_{k=1}^K \frac{n_k}{N} D_k^B \right] + D^B . \quad (6)$$

Thus, the overall MLD is composed of the sum of the weighted within-region MLDs ( $D_{k,l,m}$ ), the weighted between-region MLDs of each country ( $D_{k,l}^B$ ), the weighted between-country MLDs of each area ( $D_k^B$ ) and the between-area MLD ( $D^B$ ). The weights of the within-region MLDs are equal to the respective region's share in the overall population, the weights of the between-region MLDs are equal to the population shares of the countries, within which these regions are located, and the weights of the between-country MLDs are equal to the population shares of the areas, within which these countries are located.

It is a special property of the MLD, that the inequality measured over a poorer population is given equal weight as the inequality measured over a richer population of equal size. This is not the case for the Theil index which has been employed by Beblo and Knaus (see above). The Theil index weights each population group proportional to its income share. As a consequence, Germany and France account for more than a half of the within-country inequality reported in their study. This might have been appropriate in the context of their research which was driven by the intention to accentuate the “countries’ economic standings in terms of political power within the European Monetary Union”

rather than to “evaluate the effectiveness of distribution policies” (Beblo and Knaus 2001: 307). By contrast, the analysis at hand seeks to evaluate the potentials of policies targeting regional cohesion and redistribution of income. Poor and rich citizens shall be equally represented in this evaluation.

## **5. Results**

In the following, it will first be examined, how the personal inequality of income has developed during the second half of the 1990s, before the inequality observed in 1999/2000 will be decomposed into its geographical components.

### *5.1. Development of Inequality*

The LIS includes household data from 16 European countries that refer to the years 1999 and 2000. For 15 of these countries (except for Estonia), earlier interview rounds are available, allowing us to analyze the change of income inequality within the countries, measured in terms of the MLD, and of national average disposable income (DI) per head. The results of this exercise, presented in table 1, reveal a considerable dynamic of within-country inequality. The Scandinavian countries in the sample, Finland and Sweden, in which the incomes were most equally distributed in the middle of the 1990s, showed a strong growth of inequality during the second half of this decade, so that Finland moved to the second and Sweden to the fifth rank in the investigated country sample. In the liberal and Mediterranean welfare states inequality shows a declining trend although its level is still comparatively high.

Table 1: Development of average income and income inequality within countries

Country	1st round				2nd round				Av. change per year <sup>2</sup>	
	Year	Mean DI <sup>3</sup> (PPS) <sup>1</sup>	MLD	Cases	Year	Mean DI <sup>3</sup> (PPS) <sup>1</sup>	MLD	Cases	Mean DI <sup>3</sup> (%)	MLD (%)
Luxembourg	1997	24.121	0.1118	2.514	2000	25.988	0.1094	2.418	2.6	-0.7
Finland	1995	14.481	0.0818	9.257	2000	15.977	0.1112	10.419	2.1	7.2
Slovenia	1997	10.414	0.1114	2.576	1999	10.540	0.1125	3.858	0.6	0.5
Austria	1997	17.520	0.1280	2.674	2000	18.547	0.1181	2.358	2.0	-2.6
Sweden	1995	13.832	0.1056	16.221	2000	16.154	0.1199	14.471	3.4	2.7
Germany	1994	15.649	0.1356	6.367	2000	17.226	0.1278	10.979	1.7	-1.0
Netherlands	1994	14.602	0.1342	5.134	1999	16.548	0.1358	4.968	2.7	0.2
Hungary	1994	6.203	0.1864	1.929	1999	5.814	0.1490	2.013	-1.3	-4.0
Poland	1995	5.280	0.1764	31.562	1999	6.564	0.1561	31.375	6.1	-2.9
Ireland	1996	14.227	0.1896	2.639	2000	17.442	0.1856	2.447	5.6	-0.5
Belgium	1995	16.290	0.1290	2.627	2000	18.912	0.1858	2.359	3.2	8.8
Greece	1995	11.645	0.2255	4.775	2000	12.226	0.2019	3.873	1.0	-2.1
Spain	1995	13.025	0.2254	5.861	2000	15.643	0.2066	4.763	4.0	-1.7
Italy	1998	15.147	0.2351	7.079	2000	15.111	0.2066	7.923	-0.1	-6.1
UK	1995	16.276	0.2161	6.750	1999	18.749	0.2102	24.824	3.8	-0.7

<sup>1</sup> Purchasing Power Standards in prices of 2000. <sup>2</sup> Growth between the first and second round divided by number of years. <sup>3</sup> Disposable income per equivalent adult.

The rapid increase of inequality in CEE countries, which Milanovic has observed for the beginning of the decade (see above, section 3), seemingly came to an end. The MLD of Hungary decreased on average by 4 percent of its 1994 value each year, the MLD of Poland by 3 percent of its 1995 value, while the MLD of Slovenia remained almost constant. All in all, we observe a clear convergence of intra-country inequality. The average annual growth rate of the MLD (last column of the table) correlates to the initial MLD value (fourth column) by a factor of -0.642, and this correlation has been proven to be significant at the one-percent level. Surprisingly, a convergence of national average disposable income levels can hardly be observed. The correlation between the growth of disposable income (tenth column) and its initial level (third column) is not statistically significant and amounts to only 0.051.

## 5.2. The Spatial Structure of Inequality

The LIS datasets of most countries surveyed in either of the years 1999 and 2000 contain regional identifiers allowing us to classify the interviewed households into NUTS1 regions. These identifiers are only included for a few countries in the earlier survey waves, so that the following analysis can only be carried out for one cross-section. The LIS data have been matched with data on population numbers in NUTS1 regions, obtained from the Eurostat Newchronos database, and regional MLDs have been calculated for each of these regions. MLDs for each country have been derived using formula (5), and for each geographical area, CEE and EU15, using formula (4). Finally, the MLD of income inequality across all persons in the whole sample of countries has been calculated using formula (3). The results are presented in table 2. The first block of the table shows the inequality occurring across persons within the regions. The numbers in the sixth column correspond with the  $D_{k,l,m}$  variable in formula (6), the numbers in the fourth column are the population shares,  $n_{k,l,m}/N$ . The second block shows the inequality occurring across regions within the countries. The between-region MLDs ( $D_{k,l}^B$ ) are listed in the sixth column. They result from the distribution of average disposable income over the regions, shown in the fifth column of the previous block. Analogously, the third block presents the inequality occurring across countries within the EU15 and CEE ( $D_k$ ). The inequality between the E15 and CEE ( $D^B$ ) is shown in the row below this block.

The overall inequality across persons in the country sample, is presented in the last row of the table. It amounts to 0.217 scores of the MLD. This can be viewed as a high inequality of personal income compared to many countries of the world. For example, Shorrocks and Wan (2004) who review the results of a number of country studies, report higher MLDs around the same time period only for Russia (0.329 in 1999), Canada

(0.312 in 1997), the Phillipines (0.303 in 1997), Ghana (0.269 in 1996) and Indonesia (0.233 in 2002).

The rows at the bottom of each block summarize the averages of inequality at the respective level of decomposition and their contribution to the overall MLD. We find that more than a fifth (21.6 percent) of the overall inequality is attributed to the income gap between the western and eastern part of the EU. The differences between the countries (within the areas) account for another 1.3 percent, and the differences between the regions (within the countries) for less than 1 percent of the overall inequality. More than three quarters of the inequality stem from differences between inhabitants of the same NUTS1 regions.

The differences in national average income levels are much smaller within CEE (MLD of 0.0011) than within the EU15 (MLD of 0.0057). The “divided economy” of Italy (European Commission 2001: 6), shows the highest regional disparities among the investigated countries. Germany is on the fourth rank, even though it incorporates five former socialist regions where disposable income is still comparatively low. Narrowing the focus further and looking at the inequality within regions, we find that it is often the regions incorporating the capital or a bigger agglomeration which show the highest levels of interpersonal inequality (for example Ostösterreich in Austria, Hamburg and Berlin in Germany, London in the UK, Centralny in Poland).

Table 2: Spatial decomposition of inequality

Area / country / region	Population		DI per head (PPS)	MLD			Cases	
	(1000)	(%)		(abs.)	(wgt.)	(%)		
<i>Inequality across persons</i>								
Austria	Ostösterreich	3,365	1.00	19,399	0.1319	0.0013	0.61	1,011
	Westösterreich	2,904	0.86	18,023	0.1119	0.0010	0.45	738
	Südösterreich	1,743	0.52	17,622	0.0951	0.0005	0.23	595
Belgium	Flanders	5,946	1.77	19,811	0.2196	0.0039	1.79	1,300
	Wallonia	3,343	0.99	17,265	0.1317	0.0013	0.60	824
	Brussels	962	0.29	18,602	0.1299	0.0004	0.17	235
Finland		5,151	1.53	15,977	0.1112	0.0017	0.78	10,419
Germany	Hamburg	1,710	0.51	17,565	0.2010	0.0010	0.47	173
	Berlin	3,384	1.01	17,188	0.1537	0.0015	0.71	443
	Hessen	6,058	1.80	18,973	0.1480	0.0027	1.23	742
	Bayern	12,188	3.62	18,212	0.1452	0.0053	2.42	1,514
	Bremen	662	0.20	16,592	0.1424	0.0003	0.13	94
	Schleswig-Holstein	2,782	0.83	18,400	0.1413	0.0012	0.54	342
	Niedersachsen	7,911	2.35	17,711	0.1289	0.0030	1.40	891
	Nordrhein-Westfalen	18,000	5.35	17,566	0.1275	0.0068	3.14	2,331
	Rheinl.-Pfalz, Saarland	5,100	1.51	15,975	0.1173	0.0018	0.82	663
	Baden-Württemberg	10,493	3.12	17,952	0.1080	0.0034	1.55	1,259
	Mecklenburg-Vorpommern	1,783	0.53	14,249	0.1005	0.0005	0.25	281
	Brandenburg	2,601	0.77	15,555	0.0893	0.0007	0.32	469
	Sachsen-Anhalt	2,633	0.78	14,783	0.0883	0.0007	0.32	475
	Sachsen	4,443	1.32	14,758	0.0811	0.0011	0.49	825
	Thüringen	2,440	0.72	13,993	0.0808	0.0006	0.27	477
Greece	Kentriki Ellada	2,425	0.72	10,312	0.2094	0.0015	0.70	1,041
	Voreia Ellada	3,512	1.04	10,117	0.1954	0.0020	0.94	1,336
	Nisia Aigaiou. Kriti	1,095	0.33	11,332	0.1660	0.0005	0.25	512
	Attiki (incl. Gr. Athens)	3,885	1.15	15,047	0.1609	0.0019	0.86	916
Ireland		3,787	1.12	17,442	0.1856	0.0021	0.96	2,447
Italy	Isole	6,624	1.97	10,530	0.2735	0.0054	2.48	922
	Sud (IT)	13,952	4.14	11,469	0.2165	0.0090	4.14	1,852
	Nord Ovest	14,912	4.43	17,951	0.1650	0.0073	3.37	1,927
	Nord Est	10,565	3.14	18,406	0.1574	0.0049	2.28	1,605
	Centro (IT)	10,896	3.24	15,372	0.1380	0.0045	2.06	1,617
Luxembourg		436	0.13	25,988	0.1094	0.0001	0.07	2,418
Spain	Canarias (ES)	1,707	0.51	13,211	0.2196	0.0011	0.51	278
	Centro (ES)	5,255	1.56	13,065	0.2151	0.0034	1.55	839
	Este	11,129	3.31	18,302	0.2146	0.0071	3.27	989
	Noroeste	4,286	1.27	14,872	0.1784	0.0023	1.05	643
	Comunidad de Madrid	5,230	1.55	20,691	0.1714	0.0027	1.23	425
	Noreste	4,089	1.21	17,424	0.1684	0.0020	0.94	677
	Sur	8,568	2.54	12,303	0.1589	0.0040	1.86	904
Sweden		8,872	2.63	16,154	0.1199	0.0032	1.46	14,471
UK	London	7,285	2.16	22,048	0.2659	0.0058	2.65	2,632
	South East	8,078	2.40	22,231	0.2313	0.0055	2.56	3,506
	Eastern	5,419	1.61	20,311	0.2074	0.0033	1.54	2,398

Area / country / region	Population		DI per head (PPS)	MLD			Cases	
	(1000)	(%)		(abs.)	(wgt.)	(%)		
North West	6,881	2.04	17,594	0.1954	0.0040	1.84	3,048	
West Midlands	5,336	1.58	17,624	0.1909	0.0030	1.39	2,222	
South West	4,936	1.47	17,590	0.1867	0.0027	1.26	2,214	
Yorkshire, The Humber	5,047	1.50	16,460	0.1845	0.0028	1.28	2,229	
Scotland	5,119	1.52	17,365	0.1838	0.0028	1.29	2,169	
East Midlands	4,191	1.24	17,647	0.1744	0.0022	1.00	1,784	
Wales	2,937	0.87	16,330	0.1720	0.0015	0.69	1,345	
North East	2,581	0.77	15,339	0.1605	0.0012	0.57	1,277	
Estonia	1,370	0.41	5,222	0.2237	0.0009	0.42	6026	
Hungary	Közép-Magyarország	2,851	0.85	7,146	0.1462	0.0012	0.57	463
	Dunántúl	3,073	0.91	5,703	0.1368	0.0012	0.58	632
	Alföld és Észak	4,144	1.23	4,995	0.1333	0.0016	0.76	918
Poland	Centralny	7,723	2.29	7,326	0.1762	0.0040	1.86	6,716
	Północno-Zachodni	6,108	1.81	6,826	0.1759	0.0032	1.47	4,865
	Północny	5,753	1.71	6,223	0.1567	0.0027	1.23	4,733
	Poludniowo-Zachodni	4,068	1.21	6,430	0.1534	0.0019	0.85	3,318
	Wschodni	6,908	2.05	5,903	0.1454	0.0030	1.38	5,210
	Poludniowy	8,093	2.40	6,518	0.1184	0.0028	1.31	6,533
Slovenia		1,986	0.59	10,540	0.1125	0.0007	0.31	3,858
Total		336,711	100.00	15,236	0.1637	0.1637	75.46	130,016
<i>Inequality across regions</i>								
EU15	Italy	56,949	16.91	15,091	0.0039	0.0007	0.31	5
	Spain	40,263	11.96	15,982	0.0021	0.0003	0.12	7
	UK	57,809	17.17	18,780	0.0012	0.0002	0.10	11
	Germany	82,188	24.41	17,252	0.0008	0.0002	0.09	16
	Greece	10,918	3.24	12,037	0.0005	0.0000	0.01	4
	Belgium	10,251	3.04	18,867	0.0001	0.0000	0.00	3
	Austria	8,012	2.38	18,514	0.0000	0.0000	0.00	3
	Finland	5,151	1.53	15,977	-	-	-	-
	Ireland	3,787	1.12	17,442	-	-	-	-
	Luxembourg	436	0.13	25,988	-	-	-	-
	Sweden	8,872	2.63	16,154	-	-	-	-
CEE	Hungary	10,068	2.99	5,820	0.0003	0.0000	0.00	3
	Poland	38,654	11.48	6,565	0.0003	0.0000	0.02	6
	Estonia	1,370	0.41	5,222	-	-	-	-
	Slovenia	1,986	0.59	10,540	-	-	-	-
Total		336,711	100.00	15,236	0.0014	0.0014	0.64	58
<i>Inequality across countries</i>								
EU15		284,635	84.53	16,828	0.0057	0.0048	2.21	11
CEE		52,076	15.47	6,537	0.0011	0.0002	0.08	4
Total		336,711	100.00	15,236	0.0050	0.0050	2.29	15
<i>Inequality between the EU15 and CEE</i>								
		336,711	100.00	15,236	0.0469	0.0469	21.62	2
<b>Total MLD</b>								
					0.2169	0.2169	100.00	

## 6. Conclusions

The study presented in this paper shows that the interpersonal inequality of income, measured in terms of the Mean Logarithmic Deviation, amounts to 0.217. This is a high value compared to many countries of the world. Three quarters of this inequality are attributed to income differences between people living in the same (NUTS1) region. This is the part of the overall inequality which cannot be directly targeted by the social cohesion measures taken at EU level, but which exclusively falls into the domain of the national tax and social policy.

The inequality of national average income levels across the EU15 countries contributes only 2.3 percent to the overall MLD, and that across the CEE countries only 0.1 percent. The income gap between these two groups of countries accounts for more than a fifth (21.6 percent) of the overall interpersonal inequality. These figures reveal that the European regional cohesion policy plays quite an important role in the reduction of income inequality across EU citizens, because 24 percent of the overall inequality could theoretically be removed by equalizing all national average income levels. However, the important role of the regional cohesion policy stems predominantly from the huge income gap between the old and the new member states, and to a much lesser degree from the remaining disparities between countries. Cross-regional income differences *within* the countries have hardly any influence on overall personal inequality in Europe.

The analysis of the development of the income distribution over time reveals the interesting trend that within-country inequality has converged throughout the member states of the EU. After, during the first half of the 1990s, the inequality of income had increased within almost all of them, a reduction of inequality in the second half of the

decade is observable in the 'liberal' and Mediterranean welfare states, as well as in CEE. By contrast, inequality has continued to grow in the Nordic, sometimes called 'social-democratic', welfare states of Scandinavia. The finding of increasing inequality especially in those welfare states which traditionally incorporate extensive tax and transfer systems, supports the theory that increasing factor mobility has narrowed the scope for redistribution of income from the rich to the poor. In CEE, the explosion of income inequality as a result of the transition from planned to market economies has obviously come to an end. The unemployed and lower paid workers in these countries might now be benefiting from closer economic ties with the EU15 and the resulting specialisation in labour extensive products.

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## Annex

*Table A1: Indices used for cost-of-living adjustment across time and countries*

Country	Round 1		Round 2		Conversion rate to the Euro	PPS (2000)
	LIS survey year	Price index (2000=1)	LIS survey year	Price index (2000=1)		
Austria	1997	0.9655	2000	1.0000	13.7603	1.0397
Belgium	1995	0.9276	2000	1.0000	40.3399	1.0480
Finland	1995	0.9050	2000	1.0000	5.9457	1.1135
Germany	1994	0.9481	2000	1.0000	1.9558	1.1161
Greece	1995	0.7266	2000	1.0000	340.7500	0.7786
Ireland	1996	0.8657	2000	1.0000	0.7876	1.0844
Italy	1998	0.9520	2000	1.0000	1.9363	0.9189
Luxembourg	1997	0.9501	2000	1.0000	40.3399	1.1238
Netherlands	1994	0.8867	1999	0.9676	2.2037	1.0517
Spain	1995	0.8726	2000	1.0000	166.3860	0.8441
Sweden	1995	0.9390	2000	1.0000	/	10.4541
UK	1995	0.8945	1999	0.9884	/	0.7194
Estonia	/	/	2000	1.0000	/	8.2226
Hungary <sup>1</sup>	1994	0.3864	1999	0.9108	/	122.0960
Poland	1995	0.5666	1999	0.9173	/	2.0699
Slovenia	1997	0.8155	1999	0.9267	/	147.7010

Source: Eurostat Ameco Database.

<sup>1</sup> Price indices obtained from the Hungarian Central Statistical Office

<sup>1</sup> See Atkinson (2003) for an overview.

<sup>2</sup> That cross-country inequality matters for social welfare in Europe can also be derived from Atkinson's (1970) approach to social inequality. This rests on the assumption that all persons' standard of living is determined by the same utility function. This utility function is characterised by decreasing marginal utility. Hence, rich persons face a smaller increase of utility for each additional unit of income they receive than poorer ones. As a consequence, each unit income transferred from a richer to a poorer person increases the sum of utility in the community (principle of diminishing transfers). At given average income, the sum of utility is the higher the more equally income is distributed throughout the community. The assumption that cross-country inequality would not influence social welfare in the EU cannot be upheld as long as all European citizens are equally represented in European social welfare and the utility functions of inhabitants of different member states do not systematically differ.

<sup>3</sup> The theory of institutional competition traces back to Tiebout (1956). Seliger (1998) discusses its implications for the Baltic countries in the light of the EU enlargement.

<sup>4</sup> In the budget period from 2000 to 2006, 2645 Mio. Euros (36 Euros per head) were spent for projects in accession countries funded by Phare, ISPAR and Sapard, whereas 221 bio. Euros (589 Euros per head) were spent for projects in the EU15 funded by the structural funds and the cohesion fund (European Commission 2001; 2004).

<sup>5</sup> In 2000, GDP per employed person adjusted by purchasing power parities was in the EU15 (48,253 €) more than twice as high as in the eight accession countries (21,505 €) of CEE (Groningen Growth and Development Center, Total Economy Database).

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<sup>6</sup> Headey's and Muffels' (2003: 35f.) comparison of post-tax income distributions in Germany, the Netherlands and the United States between 1987 and 1996 confirms this relationship between inequality and the type of welfare state.

<sup>7</sup> Atkinson (1995) shows that the resulting equivalence scale is a close approximation to the official equivalence scales used in many OECD countries.

<sup>8</sup> The currencies of the EU15 countries had to be divided by the convergence rate between local currency and Euro, because the PPS of these countries are based on the Euro.