



Munich Personal RePEc Archive

**Accounting for inequality in the EU:
Income disparities between and within
member states and overall income
inequality**

Christos Papatheodorou and Dimitris Pavlopoulos

2003

Online at <https://mpa.ub.uni-muenchen.de/209/>
MPRA Paper No. 209, posted 7 October 2006



Consortium of Household Panels for European Socio-Economic Research

CHER

**Accounting for inequality in the EU: Income
disparities between and within member states and
overall income inequality**

by Christos Papatheodorou and Dimitris Pavlopoulos

Document n° 9

2003

Corresponding author:

Christos Papatheodorou
Democritus University of Thrace
Dept. of Social Administration
P. Tsaldari 1
GR-69100, Komotini, Greece.
E-mail: christos@socadm.duth.gr

Dimitris Pavlopoulos
Tilburg Univeristy
Dept. of Sociology
Warandelaan 2, P.O. BOX 90153
5000 Le Tilburg, The Netherlands
E-mail: D.Pavlopoulos@uvt.nl

This publication was supported by the European Commission within the programme “Improving the Human Research potential and the Socio-Economic Knowledge Base”

Comparative Research on Household Panel Studies

This series presents the results of research projects based on the analysis of one or more household panel studies from the CHER micro database. Papers will cover the wide range of substantive topics and investigations of the particular problems of comparative research.

The series contains in papers no. 1 – 16, among other papers, the results of all of the work being carried out as part of the CHER project, which was funded by the European Commission under within the program “Improving the Human Research potential and the Socio-Economic Knowledge Base. CHER aims to develop instruments for analyzing, programming and stimulating socio-economic policies, and for comparative research on policy issues such as labor force participation, income distribution, unpaid work, poverty, household composition change, and problems of the elderly.

Coordination of the CHER project is provided by CEPS/INSTEAD, Differdange, Luxembourg.

The main partners are:

Joachim R. Frick, Deutsches Institut für Wirtschaftsforschung , DIW Berlin, Germany
Kimberly Fisher, Institute for Social & Economic Research, ISER Essex University, Colchester, UK

The distinguished partners are:

Alain Degenne, Institut du Longitudinal CNRS-LASMAS, Caen, France
Franco Peracchi, Centre for International Studies on Economic Growth, CEIS, Tor Vergata University, Rome, Italy
Sergi Jimenez, Department of Economics, Universidad Carlos III, UIIIIM, Madrid, Spain
Zoltan Fabian, Social Research Informatics Center , TARKI Budapest, Hungary
Brunon Gorecki, Dept. of Economics, University of Warsaw, UWARS, Poland
Ruud Muffels, WORC/TISSER, Katholieke Universiteit Brabant, Tilburg, Netherlands
Rudy Marynissen, University of Antwerp, UIA, Antwerp, Belgium
John Kallas, National Centre for Social Research, EKKE, Athens, Greece
Erwin Zimmermann, The Swiss Household Panel, SHP, Neuchâtel, Switzerland

For more information about this series, or to submit papers for inclusion, contact:

Günther Schmaus
CEPS/INSTEAD
Anc. Bât. administratif ARBED
Rue E. Mark, Boîte postale 48
L- 4501 Differdange
Tel: +352 58 58 55-509
Fax: +352 58 55 88

e-mail: gunther.schmaus@ci.rech.lu

url: <http://cher.ceps.lu>

Acknowledgement

This research was carried out as part of the work of the *Consortium of Household Panels for European Socio-economic Research (CHER)*, within the programme “*Improving the Human Research potential and the Socio-Economic Knowledge Base*” (Project number HPSE-CT-1999-00037).

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

Papatheodorou, C. and Pavlopoulos, D. (2003) - “**Accounting for inequality in the EU: Income disparities between and within member states and overall income inequality**”, CHER Working paper 9, CEPS/INSTEAD, Differdange, G.-D. Luxembourg,.

An earlier version of this paper was presented at CHER workshop in Tilburg (January 20-21, 2003) and authors are grateful for comments received there. We would particularly like to thank Maria Petmesidou for her useful comments on an earlier draft.

For an on-line version of this working paper and others in the series, please visit the Institute’s website at: <http://cher.ceps.lu/>

Abstract

In fighting inequality and poverty in the EU emphasis has been placed in reducing differences between countries and/or regions regarding certain macroeconomic indicators, such as the GDP per capita. However, from a policy perspective it is important to know the extent to which overall inequality in the EU is attributed to inequality between the individual countries and the extent to which it is attributed to inequality within them. In addition, it is important to know the extent to which income disparities in each individual member state contribute to overall EU inequality. Following certain assumptions, hypotheses and alternative scenarios, this paper investigates the above questions, employing a decomposition analysis of inequality by population subgroup and utilizing data and information provided by the CHER programme. A number of alternative inequality indices were used to capture the different aspects of inequality and test the robustness of the estimates. The suggested typologies of welfare state regimes were also examined to explain the differences in income inequality between countries and their contribution to overall EU inequality. Policy analysts and policy makers could benefit greatly from such information in evaluating, designing and implementing interventions to deal with inequality and poverty in the EU.

Keywords: Income inequality, decomposition analysis, welfare state regimes, EU
JEL-Codes: D31, D63, I30

1. Introduction

The main aim of this paper is to investigate the structure of inequality in the EU. Based on empirical results, the dominant perspectives in both political and economic debates have emphasized the differences between the rich countries of the north and the poor countries of the south (including Ireland) in order to explain a large part of economic inequality in the EU. Thus, during the last two decades, the EU policy priorities have been mainly focused on reducing the differences between EU countries and/or regions regarding their performance in certain macroeconomic indicators.

This study intends to examine the extent to which overall income inequality in the EU is attributed to inequality between the individual countries and the extent to which it is attributed to inequality within them. Furthermore, this study aims to measure the extent to which income disparities in each individual member state contribute to overall EU inequality. During the last decade, the classification of countries in welfare state regime clusters has also gained increasing significance in cross-national comparisons of social and economic inequalities. Based on the typologies suggested by Esping-Andersen (1990, 1999) and Ferrera (1996), this study also investigates whether these typologies help explain or classify the observed differences in income inequality between countries and/or their contribution to overall EU inequality.

In order to explore the above questions, a decomposition analysis by population subgroups is employed. A number of inequality indices are used in order to capture the different aspects of inequality and test the robustness of the results. The information provided by this analysis may prove significant for policy makers in

evaluating, as well as in designing and implementing effective policy interventions in tackling inequality and poverty in the EU.

The structure of the rest of the paper is as follows: The data used for the analysis and the adopted variables are presented in Section 2. The methodology followed is discussed in Section 3. Emphasis is placed in presenting the properties of the inequality indices used and explaining the decomposition analysis by population subgroup, adopted in the present study. In this section, the welfare state typologies applied in the analysis are also presented. In Section 4 we present and discuss income inequality among and between EU countries, employing some conventional and broadly used inequality indices and summary measures. The findings of the decomposition analysis are demonstrated and commented on in Section 5. Finally, Section 6 summarises the main findings and provides some policy recommendations.

2. The Data

This study uses data from the programme *Consortium of Household panels for European socio-economic Research* (CHER). The CHER programme aims to create a database with comparable data and information on the socioeconomic characteristics of individuals and households from 21 countries of Europe and North America. We make use of the 1999 CHER data for EU countries. However, there were no available data for Sweden. In addition, we do not include Belgium since the relevant income variables were considered quite problematic.

In our analysis total net household income is used as the main economic variable. This is the total household income after taxes and social security contributions, and refers to the year prior to the survey. Households with zero or negative income were excluded from the present analysis. In order to make households of different size and composition comparable, the modified OECD equivalence scale is used. According to this scale, the head of household is given a weight of 1, each additional adult a weight of 0.5 and each child a weight of 0.3. A household member is considered adult when she/he is more than 14 years old.

An obstacle to similar cross-country comparisons of peoples' standard of living and welfare -a standard based on information on personal income- exists due to the differences between countries in the relative price levels and/or expenditure and consumption patterns. Two main alternatives have been suggested and used broadly in order to overcome this problem; exchange rates and Purchasing Power Parities (PPPs). Following EUROSTAT (2001), we argue in favour of the PPPs as more appropriate, and have used them in our analysis. As Vachris and Thomas (1999) pointed out, PPPs provide the proper basis for cross-country comparisons because they are constructed by taking into account the differences between relative price levels and expenditure patterns across countries.

3. The Methodology

As noted above, the main aim of this paper is to test whether overall income inequality in Europe is attributed mainly to inequalities between or to inequalities

within individual countries. The dominant view in the political and economic debate is that the EU consists of rich countries in the north and poor countries in the south (including Ireland). This difference between rich and poor countries is generally employed to explain a large part of income inequality in the EU. The policy implication of these perspectives is apparent in designing and implementing interventions at a national and EU level. Furthermore, in this study we intent to investigate whether the suggested typologies of welfare state regimes could help explain the differences in income inequality between countries and their contribution to overall EU inequality. In order to classify countries to various types of welfare regime, we use Esping-Andersen's (1990) typology. According to this typology, there are three main types of welfare state regimes; the social democratic, the corporatist (conservative) and the liberal. However, other authors such as Ferrera (1996), Muffels and Fouarge (2001) have argued that southern EU countries form a separate welfare regime, the southern welfare regime.¹ Based on the suggestion of these studies, we use the following classification in our analysis that is based on Esping-Andersen's typology expanded by Ferrera's hypothesis of the southern model:²

¹ In Esping-Andersen's (1990) typology, Italy is placed within the family of the corporatist welfare state regime. He did not clearly include Greece, Spain and Portugal in this typology. Although he recognises that these countries share some common characteristics, he sees them as part of the corporatist regime (Esping-Andersen 1996, Arts and Gelissen 2002). A number of researchers in this field, such as Katrougalos (1996), support this perspective and consider these countries as a subgroup of the continental model. By contrast, the typology proposed by Leibfried (1992), which is based on the welfare policies in combating poverty, distinguishes the Latin Rim counties that include Italy, Spain, Portugal, Greece and France. Ferrera (1996) first talked about the "Southern model" which is characterised as "particularistic-clientelistic" and includes Italy, Spain, Portugal and Greece.

² Luxembourg was not classified in Esping-Andersen's (1990) typology. However, Ferrera (1996) included Luxembourg in the Bismarckian model and thus we decided to consider it in our analysis as belonging to the group of countries with a corporatist welfare regime. Nevertheless, due to its population size, Luxembourg's impact on overall EU inequality is rather marginal. Similarly, following Ferrera's suggestion, we decided to consider Italy as part of the Southern model, and not part of the corporatist regime as Esping-Andersen suggested.

Welfare state regime classification

| Liberal | Conservative (Corporatist) | Social- democratic | Southern |
|-----------------------|---------------------------------------|-------------------------------|-----------------|
| United Kingdom | Germany | Denmark | Italy |
| Ireland | France | Netherlands | Greece |
| | Luxembourg | Austria | Spain |
| | Finland | | Portugal |

In the above classification we have marked with bold those countries that most of the proposed classifications (Esping-Andersen 1990, 1999, Leibfried 1992 and Ferrera 1996) agree that they represent different welfare regimes (see Arts and Gelissen 2002). Thus United Kingdom represents the liberal regime, Germany represents the corporatist regime and Denmark represents the Social-democratic regime. Finally, Greece, Spain and Portugal were not included in Esping-Andersen’s typology, but were included in a separate regime according to Ferrera’s and Leibfried’s typologies and thus they are considered as representing the southern model

Our analysis will unfold in three steps: First, we will present and discuss some main findings on inequality in EU countries employing some of the broadly used summary measures. Second, we will decompose EU into within-country and between country components. Third, we will examine the extent to which each country contributes to overall inequality in the EU.

i. Decomposition of Inequality by Population Subgroups

The decomposition analysis of inequality by population subgroups has been broadly used by various studies that investigate inequality within a country (or region). The population subgroups used in these studies are usually those formed according to certain social and demographic characteristics of the unit of analysis such as the

household size or type, and the age, occupational status and educational level of the individuals. In the present analysis, EU is considered as the total population and the countries as the population subgroups.

This method allows us to examine the extent to which overall inequality is attributed to inequality between countries and to inequality within them. In order to investigate this, we decompose inequality into a within group and a between group component. The between group component is the overall inequality that would remain if all citizens of each country had income equal to the country's average. The within group component is the inequality that would emerge if mean incomes of all countries were equalized, but inequality within each country remained the same.

Not all inequality indices are appropriate for such an analysis. An inequality index could be decomposed only if total inequality were expressed as an aggregate function of each inequality's subgroup, mean income and population (Cowell 1995).

Consider a population of n income units divided in k subgroups with populations n_1, n_2, \dots, n_k and average incomes $\mu_1, \mu_2, \dots, \mu_k$ respectively. Thus, total inequality I (in a given time period) for any income distribution could be expressed as:

$$I = F(I_1, I_2, \dots, I_k : \mu_1, \mu_2, \dots, \mu_k : n_1, n_2, \dots, n_k)$$

where I_k is the inequality in group k .

Although there are a lot of inequality indices, only a few are additively decomposable by population subgroups.³ As Shorrocks (1984) and Cowell (1995) point out, all inequality indices with the above property belong to the family of Generalized Entropy Indices E_θ . This family of indices can be expressed as:

$$E_\theta = \begin{cases} \frac{1}{\theta(1-\theta)} \left[\frac{1}{n} \sum_i \left(\frac{\psi_i}{\mu} \right)^\theta - 1 \right] & \text{if } \theta \in \mathfrak{R} - \{0,1\} \\ \frac{1}{n} \sum_{i=1}^n \ln \left(\frac{\mu}{\psi_i} \right) & \text{if } \theta = 0 \\ \frac{1}{n} \sum_{i=1}^n \left[\frac{\psi_i}{\mu} \ln \left(\frac{\psi_i}{\mu} \right) \right] & \text{if } \theta = 1 \end{cases}$$

where ψ_i is the equivalent income of household i .

For each value of θ the index can be additively decomposed as:

$$I_T = I_B + I_W$$

where I_W is within-group inequality and I_B is between-group inequality.

The between group inequality could be written as:

$$I_B = \frac{1}{\theta(1-\theta)} \left[\sum_k \frac{n_k}{n} \left(\frac{\mu_k}{\mu} \right)^\theta - 1 \right] \text{ if } \theta \in \mathfrak{R} - \{0,1\}$$

and the within - group inequality as:

$$I_W = \sum_k \left(\frac{n_k}{n} \frac{\mu_k}{\mu} \right)^\theta \left(\frac{n_k}{n} \right)^{1-\theta} I_k \text{ if } \theta \in \mathfrak{R} - \{0,1\}$$

³ A more detailed discussion on the indices that are suitable for this type of decomposition analysis and their properties provided by Bourguignon (1979), Cowell (1980, 1988, 1995) Shorrocks (1980) Anand (1983).

For the decomposition analysis of inequality, the following three indices, part of the family of Generalized Entropy measures E_θ , were used; E_0 : *Mean Logarithmic Deviation* (L), E_1 : *Theil index* (T) and E_2 : *Half the Squared Coefficient of Variation* ($C^2/2$). Decomposition of T and L by k population subgroups is done as follows:

$$T = \sum_{i=1}^k \left(\frac{n_i \mu_i}{n \mu} T_i \right) + \left[\sum_{i=1}^k \left(\frac{n_i \mu_i}{n \mu} \ln \mu_i \right) - \ln \mu \right]$$

$$L = \sum_{i=1}^k \left(\frac{n_i}{n} L_i \right) + \left[\ln \mu - \sum_{i=1}^k \left(\frac{n_i}{n} \ln \mu_i \right) \right]$$

Among the Generalized Entropy Measures, as θ decreases the index becomes more sensitive to transfers at the lower income strata. The Generalized Entropy Measures function is differentiable with respect to incomes. Following Shorrocks (1980), this means that the change $\Delta(\psi_\alpha, \psi_\beta, \delta)$ in the index value corresponding to a transfer of an income portion δ from one person with income ψ_α to another with income ψ_β can be effectively approximated by the differential of the E_θ function.

$$\Delta(\psi_\alpha, \psi_\beta, \delta) = d \left(\frac{1}{\theta(1-\theta)} \left[\frac{1}{n} \sum_{i=1}^n \left(\frac{\psi_i}{\mu} \right)^\theta - 1 \right] \right) \cdot \delta = \frac{\partial E_\theta}{\partial \psi_\alpha} \cdot \delta + \frac{\partial E_\theta}{\partial \psi_\beta} \cdot (-\delta)$$

$$\text{then } d(\psi_\alpha, \psi_\beta, \delta) = \frac{\delta}{n(1-\theta)\mu^\theta} (\psi_\alpha^{1-\theta} - \psi_\beta^{1-\theta}) \text{ if } \theta \neq 0, 1.$$

Consequently, among the above three indices L is more sensitive to transfers at the lower income strata and $(C^2/2)$ is more sensitive to differences at the top.

ii. Country contribution to within group component of overall EU inequality

One of the aims of this study is to examine the extent to which each country is ‘responsible’ for the within group component of overall inequality in the EU. As we can easily calculate, country i contributes to the within group component of overall inequality indices by:

$$L_{wi} = \frac{n_i}{n} L_i$$

$$T_{wi} = \frac{n_i \mu_i}{n \mu} T_i$$

$$\left(C^2/2\right)_{wi} = \left(\frac{n_i \mu_i}{n \mu}\right)^2 \left(\frac{n_i}{n}\right)^{-1} \left(C^2/2\right)_i$$

A problem in performing this analysis is related to the fact that the sample sizes of the CHER survey are not proportional to the real population of each EU country. For this reason, in our analysis we weight cases by the ratio of the real country’s population to the CHER sample size for each country. However, in the interpretation of our results we take into account the ratio of each country’s population to overall EU population.

Of course, in interpreting our findings, we cannot be certain of the extent to which any within group contribution a country has on overall inequality is attributed to that country’s population. Obviously, countries with large populations will contribute more to the within group component of overall EU inequality than countries with smaller populations. In order to overcome this problem and present estimates on each country’s contribution to overall inequality immune from its population size, we also perform the same decomposition analysis supposing that all countries have the same

population.⁴ Thus the question we investigate is what would be the contribution of each individual country to overall EU inequality if all countries had an equal size population.

4. Income Inequality in EU Countries

Employing some conventional inequality indices and summary measures is the most usual way for appraising income inequality among and between countries. Table 1 presents the estimates on inequality based on some of the most widely used indices; the Mean Logarithmic Deviation (L), the Theil index (T), the Gini and the Squared Coefficient of Variation ($C^2/2$). These indices have been used extensively in similar exercises and fulfil the most desirable properties that inequality indices should have; the anonymity, the mean independence, the population independence and the principle of transfers (see Jenkins 1991, Cowell 1995).

As we can observe in Table 1, inequality of income varies considerably between EU countries. However, as also Table 2 shows, the rank of these countries according to the degree of inequality is affected significantly by the inequality index used. Estimates of Mean Logarithmic Deviation (L) rank Portugal first, as the country with the highest inequality, followed by Greece, Spain, Ireland and the UK. The smallest inequality is observed in Luxembourg followed by Denmark and the Netherlands.

⁴ We assume that all countries have 1000 households and thus we weight our data accordingly. More specifically, we weight each case (household income) by the ratio of 1000 to the country's (CHER) sample size. This has no effect on the measurement of inequality in each individual county since Generalized Entropy Indices satisfy the property of population independence.

Table 1

| INCOME INEQUALITY IN EU COUNTRIES (CHER 1999) | | | | | | |
|--|-----------------------|---|--------------|--|-------------|--------------|
| Welfare regime | Country | Mean Logarithmic Deviation | Theil | Half the squared coefficient of Variation | Gini | Cases |
| Social- democratic | The Netherlands | 0.138 | 0.140 | 0.213 | 0.267 | 4883 |
| | Denmark | 0.118 | 0.120 | 0.166 | 0.251 | 2331 |
| | Austria | 0.160 | 0.154 | 0.208 | 0.287 | 2809 |
| Corporatist | Luxembourg | 0.116 | 0.128 | 0.182 | 0.263 | 2374 |
| | France | 0.163 | 0.172 | 0.334 | 0.296 | 5593 |
| | Finland | 0.161 | 0.157 | 0.209 | 0.291 | 3816 |
| | Germany | 0.140 | 0.126 | 0.154 | 0.265 | 6993 |
| Liberal | United Kingdom | 0.189 | 0.183 | 0.267 | 0.317 | 4252 |
| | Ireland | 0.208 | 0.248 | 0.640 | 0.341 | 2372 |
| Southern | Italy | 0.175 | 0.162 | 0.205 | 0.303 | 6148 |
| | Greece | 0.239 | 0.232 | 0.324 | 0.362 | 3949 |
| | Portugal | 0.255 | 0.252 | 0.358 | 0.375 | 4631 |
| | Spain | 0.210 | 0.188 | 0.235 | 0.331 | 5301 |
| EU(13) | | 0.187 | 0.176 | 0.258 | | |

Note: All incomes are equivalized by the relevant modified OECD scale

This ordering changes to some extent when estimates of the Theil index are used. Portugal is still the country with the highest inequality but now Ireland takes the second place, followed by Greece, Spain and France. Denmark is the country with the lowest inequality followed by Germany and Luxembourg. When in our exercise estimates on the Half of the Squared Coefficient of Variation are used, Ireland becomes the country with the highest inequality, followed by Portugal, France and Greece. Similar differences in inequality ordering between these countries are shown when the Gini index is used. However, differences in inequality ordering have been observed in similar studies (see Smeeding 1991, Atkinson et al 1995, Papatheodorou

et al 2002). These differences are attributed to the fact that inequality indices are not value free; each of them is more sensitive to transfers on different parts of the distribution of income.⁵

Table 2

| INEQUALITY RANKING FOR EU COUNTRIES (CHER 1999) | | | | | |
|--|-----------------------|-----------------------------------|--------------|--|-------------|
| Welfare State Regime | Country | <i>Mean Logarithmic Deviation</i> | <i>Theil</i> | <i>Half the Squared Coefficient of Variation</i> | Gini |
| <i>Social-democratic</i> | Denmark | 12 | 13 | 12 | 13 |
| | Netherlands | 11 | 10 | 7 | 10 |
| | Austria | 9 | 9 | 9 | 9 |
| <i>Corporatist</i> | Germany | 10 | 12 | 13 | 11 |
| | Luxembourg | 13 | 11 | 11 | 12 |
| | France | 7 | 6 | 3 | 7 |
| | Finland | 8 | 8 | 8 | 8 |
| <i>Liberal</i> | United Kingdom | 5 | 5 | 5 | 5 |
| | Ireland | 4 | 2 | 1 | 3 |
| <i>Southern</i> | Italy | 6 | 7 | 10 | 6 |
| | Greece | 2 | 3 | 4 | 2 |
| | Spain | 3 | 4 | 6 | 4 |
| | Portugal | 1 | 1 | 2 | 1 |

Note: Countries are sorted in descending order with respect to the values of the inequality index.

One general comment we can draw from Table 1 is that, the estimates of all indices employed show that the countries which are categorized as belonging to the southern welfare regime type show relatively high rates of inequality. All indices used show that the countries belonging to this group, with the exception of Italy, have higher

⁵ A presentation of inequality indices and their properties can be found in Atkinson 1983, Atkinson and Bourguignon (2000), Anand (1983), Jenkins (1991), Lambert (1993), Cowell (1995), Sen (1997).

inequality than the overall inequality found in the EU(13).⁶ High levels of inequality were also found in the countries of the liberal welfare regime. Inequality in the UK and Ireland is always higher than the corresponding figures for EU(13). By contrast, the countries of the social-democratic welfare regime, show relatively low levels of inequality which are well below the corresponding figures for overall inequality in the EU(13). Similarly relatively low levels of inequality were also found in the countries of the corporatist welfare regime. With the exception of France, the corresponding figures in all countries of this regime shows that inequality is always lower than the one found in total EU(13).⁷ However, when we look at the representative countries of each regime, we have a clearer picture of the differences in inequality between welfare regimes. The lowest inequality was found in Denmark (social-democratic regime), followed by Germany (corporatist regime) which also shows lower level of inequality than EU(13). The worst performance in inequality was found in Greece, Portugal and Spain (southern model), followed by the United Kingdom (liberal regime). The inequality in all these countries is found to be higher than the representative figures for the total EU.

Accounting for the properties of the inequality indices used in the present analysis could help us shed more light on our conclusions and make some interesting observations. In Table 2, the countries are sorted in descending order with respect to the values of the inequality indices that belong to the Generalised Entropy family and Gini index. We can see that the rank of southern European countries is lower when the value of parameter θ is also low and the rank becomes higher as the value of θ

⁶ An exception is the figure given by Half the Squared Coefficient of Variation for Spain, which is slightly higher than the corresponding figure for total EU(13).

⁷ The inequality in France is found to be higher than the total inequality in EU(13) when measured by the Half the Squared Coefficient of Variation.

increases. This indicates that the countries of the southern welfare regime have greater income disparities at the lower income strata. By contrast, the rank of Ireland and France becomes higher as θ decreases. This shows that the countries have relatively higher income inequality among upper income groups. Germany, which is considered representative of the corporatist welfare regime, shows lower rank for higher values of θ . However, the way that income is distributed among the people varies also considerably among countries belonging to the same welfare state regime.

5. Countries' Contribution to Overall EU Inequality

The analysis in the previous section has provided figures on the inequality in EU countries, by employing some of the broadly used indices and summary measures. Although this information is quite valuable in comparing inequality between countries, it does not say much about the extent to which this inequality contributes to overall inequality in the EU. Furthermore, from a policy perspective it is very important to have information on the extent to which overall inequality in the EU is attributable to inequality between countries and on the extent to which it is attributable to inequality within countries. To investigate these issues, we first decompose EU inequality into within-countries and between-countries components. The analysis in Table 3 shows that, according to all the indices used, the between-countries inequality accounts for only a small part of the overall inequality in the EU. None of the indices show that more than 7.8% of overall inequality is attributable to the between-group component. In other words, more than 92% of overall EU inequality is attributed to income disparities within member states. The lowest

contribution (5%) that the between-group component has on overall inequality was given by the Half the Squared Coefficient of Variation, which among these indices is the most sensitive index to disparities at the higher income strata.

Table 3

| DECOMPOSITION ANALYSIS OF INEQUALITY IN EU BY POPULATION SUBGROUPS (COUNTRIES) - (CHER 1999) | | |
|---|------------------------------------|--------------|
| INDEX | Between countries component | Total |
| <i>MEAN LOGARITHMIC DEVIATION</i> | 0.015 (7.8%) | 0.187 |
| <i>THEIL</i> | 0.014 (7.7%) | 0.176 |
| <i>HALF SQUARED COEFFICIENT OF VARIATION</i> | 0.013 (5.0%) | 0.258 |

Note: All incomes have been equalized and weighted with respect to the relevant Purchasing Power Parity index

In Table 4, the contribution of each EU country to the within group component of overall EU inequality is presented. As expected, the impact that each individual country has on the overall within-group component of EU inequality is affected by the inequality indices used. Of course, as already mentioned the contribution that each country has to the within-group component of overall EU inequality is affected by the size of its population. As we can see, the southern EU countries' contribution decreases as the value of parameter θ increases, while for the most of the other countries their contribution to the within part of overall inequality rises as the value of θ increases. The countries of the southern welfare regime contribute to the within part of overall inequality more than they proportionally contribute to overall EU population, when indices more sensitive to transfers at the lower income strata (Mean

Logarithmic Deviation) are used. By contrast, the rest of the indices, which are more sensitive to income disparities at the higher income strata, show that the same group of countries contribute to overall inequality less than they contribute to the overall EU population. Concerning the countries of the liberal regime, all the indices employed in the analysis showed that their contribution to the within part of overall EU inequality is higher than their proportional contribution to EU population. These trends can be seen more clearly in Table 5, where each country's contribution to the within-country component of overall EU inequality is presented, under the assumption that all countries have the same population. In other words, the information presented in this Table shows what would be the contribution of each individual country to overall EU inequality if all countries had an equal size population.

Table 4

| COUNTRIES' CONTRIBUTION TO WITHIN COUNTRY COMPONENT IN OVERALL EU INEQUALITY (CHER 1999) | | | | | |
|---|-----------------------|-----------------------------------|--------------|--|---------------------------------|
| Welfare regime | Country | Mean Logarithmic Deviation | Theil | Half the squared coefficient of Variation | EU population percentage |
| Social-democratic | The Netherlands | 3.5% | 4.4% | 5.2% | 4.4% |
| | Denmark | 1.0% | 1.3% | 1.4% | 1.5% |
| | Austria | 2.1% | 2.3% | 2.3% | 2.3% |
| Corporatist | Luxembourg | 0.1% | 0.2% | 0.3% | 0.1% |
| | France | 15.9% | 19.2% | 26.8% | 16.9% |
| | Finland | 1.4% | 1.3% | 1.1% | 1.5% |
| | Germany | 18.6% | 19.0% | 16.6% | 22.9% |
| Liberal | United Kingdom | 17.9% | 21.2% | 23.7% | 16.4% |
| | Ireland | 1.2% | 1.6% | 2.7% | 1.0% |
| Southern | Italy | 16.3% | 14.0% | 10.3% | 16.1% |
| | Greece | 4.1% | 2.7% | 1.6% | 2.9% |
| | Portugal | 4.5% | 2.8% | 1.6% | 3.0% |
| | Spain | 13.4% | 9.9% | 6.3% | 11.0% |

Note: All incomes (which are taken in OECD equivalence scale) have been weighted with respect to the relevant Purchasing Power Parity index. Real population have been used.

Table 5

| COUNTRIES' CONTRIBUTION TO WITHIN COUNTRY COMPONENT IN OVERALL EU INEQUALITY, ASSUMING THAT ALL COUNTRIES HAVE A POPULATION OF AN EQUAL SIZE (CHER 1999) | | | | |
|---|-----------------------|-----------------------------------|--------------|--|
| Welfare regime | Country | Mean Logarithmic Deviation | Theil | Half the squared coefficient of Variation |
| Social-democratic | The Netherlands | 6.1% | 7.5% | 8.5% |
| | Denmark | 5.2% | 6.5% | 6.9% |
| | Austria | 7.1% | 7.7% | 7.3% |
| | Luxembourg | 5.2% | 11.0% | 18.9% |
| Corporatist | France | 7.3% | 8.5% | 11.4% |
| | Finland | 7.2% | 6.8% | 5.5% |
| | Germany | 6.2% | 6.1% | 5.2% |
| Liberal | United Kingdom | 8.4% | 9.6% | 10.4% |
| | Ireland | 9.2% | 11.3% | 18.5% |
| | Italy | 7.8% | 6.4% | 4.6% |
| Southern | Greece | 10.6% | 6.8% | 3.9% |
| | Portugal | 11.3% | 6.9% | 3.7% |
| | Spain | 9.4% | 6.7% | 4.1% |

The group of countries belonging to the social-democratic welfare regime have a relatively lower contribution to the overall EU inequality than their proportional contribution to EU population.⁸ Their contribution to overall EU inequality is higher when indices more sensitive to transfers at the higher levels of the income distribution are used. Those countries that are considered part of the corporatist welfare state regime do not show a clear trend. All indices used show that Germany's and Finland's contribution to the within group component of overall inequality is less than their contribution to EU population. However, the opposite results were found for Luxembourg. France contributes to (the within group) overall inequality more than it contributes to overall EU population when indices more sensitive to transfers at the

⁸ The only exception is the estimates given by Half the Squared Coefficient of Variation for the

higher income strata are used. The opposite results are found when indices more sensitive to transfers at the lower income strata are used. Based on the findings of Table 5 we may argue that when indices more sensitive to the transfers at the lower parts of the distribution are used, the countries of the southern model -with the exception of Italy- are those with the highest contribution to overall EU inequality. On this matter Italy shows more similarities with Germany and Finland (corporatist regime). By contrast, indices more sensitive to transfers at the higher income strata show that the countries of the liberal regime, as well as France and Luxembourg, are those with the highest contribution to overall EU inequality.

6. Conclusion and discussion

The aim of this study was to investigate the extent to which overall inequality in the EU is attributed to inequality between the individual countries and the extent to which it is attributed to the inequality within them. Furthermore, it aimed to examine the extent to which income disparities in each country contribute to overall EU inequality. The typology of welfare state regimes which is suggested by Esping-Andersen (1990), expanded by Ferreras' (1996) hypothesis for the southern model, was also examined in order to explain the differences on income inequality between countries and their separate contribution to overall EU inequality.

The results show that any attempt to rank countries according to the degree of inequality is affected significantly by the particular index used. Estimates based on

Netherlands, which shows that the country's contribution to overall EU inequality is higher to country's relative contribution to EU population

inequality indices more responsive to transfers at the lower parts of the distribution show that the countries of the southern welfare regime are those with the highest inequality. By contrast, countries of the social-democratic welfare regime show relatively low levels of inequality, which are much lower than the corresponding figures for overall inequality in the EU(13). The countries of the corporatist welfare regime vary significantly between them in the way that income is distributed among their population.

In order to investigate the extent to which overall inequality in EU is attributed to inequality between member states or within them, a decomposition analysis by population subgroups was employed. It was found that, according to all indices used, the between countries inequality component accounts only for a small part of overall inequality in the EU. The policy implication of these findings is apparent. Policies aiming to reduce inequality within each EU country would be far more effective in reducing overall inequality (and consequently income poverty) in the EU than policies targeting to reduce (only) disparities in average per-capita income (or GDP) between member states. In the light of these findings, we argue that the enforcement of social policies aiming to reduce inequality should become top priority on the national and EU policy agenda.

Examining each country's contribution to the within group component of overall EU inequality we see that the results vary according to the inequality index used. Indices more sensitive to the disparities at the low income strata show that the countries of the southern welfare state regime type have a larger contribution to overall EU inequality than their proportional contribution of EU population. The contribution of these

countries to overall inequality decreases, as indices more sensitive to transfers at the higher income strata are used. However, almost all the other countries show an opposite trend. Their contribution to the within part component of overall EU inequality increases as indices more sensitive to the disparities at the higher income strata are used. The countries that represent the liberal welfare regime appear to have a high contribution to the overall EU inequality. This contribution is always higher than each country's contribution to EU population, irrespectively of the inequality index used. By contrast, the countries of the corporatist welfare regime show very mixed results. France shows many similarities on this matter with the UK. Germany is the only country of the corporatist regime where all the indices used show a lower contribution to overall EU inequality than its contribution to EU population. The rest of the countries in this group appear to have a lower contribution to overall EU inequality than their relevant contribution to EU population only when indices more sensitive to the transfers at the low income strata are used. Finally, the countries of the social-democratic welfare regime were found, in general, to have a low contribution to the within group component of overall EU inequality.

The welfare state regimes, as they were introduced in the present analysis, cannot, of course, fully explain the differences in inequality between countries and/or the contribution of each country to overall EU inequality. However, the findings show that we cannot diminish their significance as a valuable frame of reference for examining and appraising differences between countries. Countries of the southern welfare regime were found, in general, to have high income inequality which, compared to the rest of the EU countries, is largely attributed to income disparities at the lower income strata. This group of countries also appears to have a high

contribution to overall EU inequality. The country of the liberal welfare regime is the one found to always have a higher contribution to overall EU inequality than the country's contribution to total EU population, irrespectively of the index's sensitivity to transfers at various parts of the distribution. It could, therefore, be argued that the southern and liberal welfare regimes are those which perform worse when it comes to income inequality figures and in regards to a country's contribution to overall EU inequality. By contrast, countries of the social-democratic welfare regime are generally found to perform better on these matters. This group of countries show low rates of inequality -lower than the average figures for the total EU- and low contribution to the within country component of overall EU inequality. Finally, no clear similar trends can be found for countries that belong to the corporatist welfare regime. Further refinement of the welfare state regimes typologies would allow us to further elucidate these matters and to appraise more accurately the impact that various welfare regimes have on income inequality and poverty. Policy makers and policy analysts could greatly benefit in the designing of policy interventions and/or the reforming of social and economic policies, in tackling poverty and reducing income inequality at a national and EU level.

REFERENCES

- Anand, S. (1983): *Inequality and Poverty in Malaysia: Measurement and Decomposition*. Oxford: Oxford University Press.
- Arts, W. and Gelissen, J. (2002): "Three Worlds of Welfare Capitalism of More? A state-of-the-art report," *Journal of European Social Policy*, 12, 137-158
- Atkinson, A. B. (1983): *The Economics of Inequality*. Oxford: Clarendon Press.
- Atkinson, A. B., and F. Bourguignon (2000): *Handbook of Income Distribution*. Amsterdam: North Holland.
- Atkinson, A. B., L. Rainwater, and T. M. Smeeding (1995): *Income Distribution in Oecd Countries: The Evidence from the Luxembourg Income Study (Lis)*. Paris: OECD.
- Bourguignon, F. (1979): "Decomposable Income Inequality Measures," *Econometrica*, 47, 901-920.
- Cowel, F. A. (1980): "On the Structure of Additive Inequality Measures," *Review of Economic and Statistics*, 47, 521-531.
- Cowel, F. A. (1988): "Inequality Decomposition: Three Bad Measures," *Bulletin of Economic Research*, 40, 309-312.
- Cowel, F. A. (1995): *Measuring Inequality*. London: Prentice Hall/ Harvester Wheatsheaf.
- Esping-Andersen, G. (1990): *The Three Worlds of Welfare Capitalism*. Cambridge: Polity Press.
- Esping-Andersen, G. (1996): "Welfare States Without Work: The Impasse of Labour Shedding and Familialism of Continental European Social Policy," in *Welfare*

States in Transition. National Adaptations in Global Economies, ed by G. Esping-Andersen. London: Sage.

Esping-Andersen, G. (1999). *Social Foundations of Postindustrial Economies*. Oxford: Oxford University Press.

EUROSTAT (2001): "ECHP UDB Manual, European Community Household Panel Longitudinal Users' Database, Waves 1 to 5, Survey Years 1994 to 1998.", Eurostat.

Ferrera, M. (1996): "The "Southern Model" of Welfare in Social Europe," *Journal of European Social Policy*, 6, 17-37.

Jenkins, S. P. (1991): "The Measurement of Income Inequality," in *Economic Inequality and Poverty: International Perspectives*, ed by L. Osberg. New York: M. E. Sharpe.

Jenkins, S. P. (1995): "Accounting for Inequality Trends: Decomposition Analyses for the UK, 1971-86," *Economica*, 62, 29-63.

Katrougalos, G. S. (1996): "The South European Welfare Model: The Greek of Welfare State in Search of an Identity," *Journal of European Social Policy*, 6, 39-60.

Lambert, P. J. (1993): *The Distribution and Redistribution of Income: A Mathematical Analysis*. Manchester UK: Manchester University Press.

Leibfried, S. (1992) "Towards a European Welfare State? On integrating Poverty Regimes into the European Community," in *Social Policy in a Changing Europe*, ed by Z. Ferge and J. E. Kolberg. Frankfurt am Main: Campus Verlag

Muffels, R., and D. Fouarge (2001): "Working Profiles and Employment Regimes in European Panel Perspective," OSA-Working Paper WP2001-12.

- Papatheodorou, C., P. Peristera and A. Kotsaki (2002): "Assessing Income Distribution Using Kernel Estimates: A Comparative Study in Five European Countries," PACO Research Paper, Document no 27. Luxembourg: CEPS/INSTEAD
- Sen, A. (1997): *On Economic Inequality*, expanded edn. Oxford: Clarendon Press.
- Shorrocks, A. (1980): "The Class of Additively Decomposable Inequality Measures," *Econometrica*, 48, 613-625.
- Shorrocks, A. (1984): "Inequality Decomposition by Population Subgroups," *Econometrica*, 52, 1369-1385.
- Smeeding, T. M. (1991): "Cross-national Comparisons of Inequality and Poverty Position", in *Economic Inequality and Poverty: International Perspectives*, ed by L. Osberg. New York: M. E. Sharpe.
- Vachris, M. A., and J. Thomas (1999): "International Price Comparisons Based on Purchasing Power Parities," *Monthly Labor Review*, 3-12.