

Discussion Paper No. 03-16

**Poverty Alleviation and the Degree
of Centralisation in European Schemes
of Social Assistance**

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Zentrum für Europäische
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Non Technical Summary

In view of the increasing importance of social assistance in the presence of rising long term unemployment, the question has been raised how effective social assistance programs are in achieving their goals of alleviating poverty and insecurity of existence. In this respect, apart from conditions for eligibility and duration of benefits, the degree of centralisation of the administrative set-ups has been discussed as one of the major issues responsible for differences in the distributive impacts the systems produce.

In this paper, the relationship between the degree of centralisation in European schemes of social assistance and their success in alleviating poverty is investigated. We start by presenting the two most frequently discussed hypotheses concerning the relationship between centralisation of social security systems and distributive outcomes in socio-economic literature: the first concerns the issue whether more centralised systems concur with more redistribution, whereas the second relates to the presumption that more decentralised systems are more efficient in redistribution.

We then summarise some of the major characteristics relating to issues of centralisation in European schemes of social assistance and introduce a set of indicators suitable for operationalising these features for quantitative analysis. Employing these indicators as input variables, several cluster analyses are conducted to classify the EU15 schemes of social assistance according to their similarity with respect to aspects of centralisation, and by means of multidimensional scaling techniques an indicator of centralisation is developed. By means of cluster analyses, we identify three broad categories of countries exhibiting a high, medium and comparatively low degree of centralisation, respectively. Apart from Greece and Portugal, where no nationwide system of social assistance existed in 1995, UK, Ireland and the Netherlands are classified as highly centralised, Belgium, Denmark, France and Finland as medium centralised and the remaining countries as comparatively highly decentralised. Employing the indicators as input variables for multidimensional scaling, a scaling of countries according to their degree of centralisation is developed that concurs with the classification obtained through cluster analyses.

Subsequently, after defining and explaining the concepts of distributive effectiveness and efficiency, on the basis of Luxembourg Income Study data for five selected EU countries an empirical analysis of poverty effectiveness and efficiency using several measures of poverty is carried out. Concerning

effectiveness, the results show the highest influence of social assistance for the UK, whereas the Italian social assistance scheme does not perform well in reducing poverty. When taking the expenditures for social assistance benefits into account, we observe a different picture: the UK falls back to the next to last position for all poverty measures applied. Italy remains on one of the last positions, whereas France occupies the top position for three out of four poverty measures now. If housing benefits are included, France cannot hold its first place for efficiency because of the comparably high budget for housing benefits.

Finally, in the light of the results from classifications and empirical analysis the relationship between the systems' degree of centralisation and their success in alleviating poverty is evaluated. Concerning effectiveness in poverty alleviation, the results provide some evidence that extremely centralised systems are more effective with regard to redistribution than extremely decentralised schemes. However, for systems with a medium degree of centralisation, the hypothesis that greater decentralisation leads to more effectiveness is not supported. With respect to efficiency, no support is lent to the hypothesis that a higher degree of decentralisation is accompanied by a better distributive efficiency. Rather, the results seem to suggest that systems with a medium degree of decentralisation do better than either extremely centralised or extremely decentralised systems.

Poverty Alleviation and the Degree of Centralisation in European Schemes of Social Assistance

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Abstract

In this paper, the relationship between the degree of centralisation and the distributive outcomes in European schemes of social assistance is investigated. For this purpose, a scheme of classification suitable for grouping the EU15 schemes except for Luxembourg according to features related to centralisation is established and an indicator for centralisation is developed. Subsequently, on the basis of LIS data the effectiveness and efficiency in reducing poverty through social assistance payments are calculated for five selected EU systems and the linkage of their distributive impacts to the degree of centralisation is examined.

JEL: I32, I38, H53

Keywords: Social Assistance, Classification, Centralisation, Poverty, Redistribution

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1 Introduction

The interest in means-tested social assistance has grown considerably when rising unemployment rates in Europe in the first half of the 1990s caused a higher number of social assistance recipients.¹ Social assistance is closely connected to other transfer payments because the end of eligibility for other transfers such as unemployment assistance often leads to eligibility for social assistance as a last safety net in social security systems. Thus, with growing numbers of unemployed social assistance has also gained importance. But how can social assistance be defined? An unambiguous international definition for social assistance does not exist,² so we have to accept a definition here which suits our purposes. Eardley et al. (1996a) suggest a categorisation which comprises the following three types of social assistance: (1) *general assistance* which provides all or almost all people below a specified minimum income with cash benefits, (2) *categorical assistance* which includes cash benefits for specific groups like the unemployed, and (3) *tied assistance* which covers specific goods or services in kind or cash like housing benefits. In the following, when mentioning social assistance we refer to Eardley's category of general assistance. The second category is not covered by our investigation but we also analyse the influence of housing benefits which are included in the third category.

Heikkilä et al. (2001) name two key objectives of social assistance in an international context: social assistance should prevent from extreme material deprivation as well as social exclusion and marginalisation in order to maintain the integration of the affected persons. Poverty alleviation therefore can be considered as one of the major goals of social assistance schemes. In view of the increasing importance of social assistance in the presence of rising long term unemployment, the question arises how effective social assistance programs are in achieving their goals of alleviating poverty and insecurity of existence.

Until the seminal contribution of Esping-Anderson (1990), most empirical work on distributive impacts of welfare programs had relied on comparing the amount of social security expenditures with their distributive outcomes. However, in view of the manifold nature of social assistance regulations, the size of the social assistance budget alone is unlikely to explain the multifaceted distributive impacts the systems produce. In particular, issues of conditions for

¹ Cf. EUROSTAT/European Commission 2000 and Puide/Minas 2001: 41f.

² Cf. Eardley et al. 1996a: 1.

eligibility, duration of benefits and the degree of centralisation of the administrative set-ups have been held responsible for differences in the distributive impacts the systems produce.

In the present paper, we focus on the investigation of the relationship between the degree of centralisation in European schemes of social assistance and their success in achieving the goal of relieving poverty. For this purpose, we start by presenting the most frequently discussed hypotheses concerning the relationship between centralisation of social security systems and distributive outcomes in socio-economic literature in section 2. Subsequently, in section 3 some of the major characteristics relating to issues of centralisation in European schemes of social assistance are summarised and a set of indicators suitable for operationalising these features for quantitative analysis is introduced. Employing these indicators as input variables, several cluster analyses are conducted to classify the European schemes of social assistance according to their similarity with respect to aspects of centralisation, and by means of multidimensional scaling techniques an indicator of centralisation is developed. In section 4, after defining and explaining the concepts of distributive effectiveness and efficiency, an empirical analysis of the impact of social assistance benefits on income poverty in five selected EU countries is presented. On the basis of Luxembourg Income Study data the effectiveness and efficiency in reducing poverty are calculated for various measures of poverty. In section 5, the linkage between the differences in centralisation and the distributive outcomes is investigated, and the hypotheses presented in section 2 are discussed in the light of these results.

2 Poverty Reduction and the Degree of Centralisation: Some Hypotheses

In socio-economic literature, the differences in distributive effectiveness and efficiency of social transfer systems found in empirical investigations were discussed at length and various arguments were put forward with respect to their possible causes. With regard to the special case of social assistance, there are important differences between countries in the way they organise the administration and deliver social assistance benefits. These differences concern the degree of centralisation, the extent of family obligations, the toughness of

means-testing and the extent to which benefits are a legal entitlement.³ In the present paper, we focus on the relationship of the distributive impacts and the degree of centralisation in systems of social assistance.

Concerning the issue of centralised versus decentralised systems, as an argument in favour of decentralised systems, the point was made that because of informational asymmetries, decentralised systems are more efficient in allocating benefits to those in need.⁴ In order to allocate benefits efficiently, the legal authority must be able to distinguish between the poor and the less poor applicants. For this purpose, knowledge of individual characteristics of single cases is necessary. It is natural to assume that local authorities are better informed which citizens are truly poor and are more familiar with social control mechanisms within the community than the central state, even if the central government sends employees on the location in order to collect the information required. Especially in the presence of means tests, which are common in systems of social assistance, a lower degree of centralisation should therefore enable a better directed allocation of benefits to those in need. Accordingly, poverty reduction should be accomplished more efficiently in more decentralised systems.

Conversely, it is frequently argued that decentralised decisions on social security programs can cause problems because of a migration externality:⁵ a local authority that pays higher benefit levels than other authorities tends to attract benefit recipients from other regions. This leads to a reduction of tax burdens in those other regions and an overburdening of the more generous region's fiscal budget, which in turn will eventually force it to cut benefit levels as well. Because of this migration externality, the degree of redistribution will be inefficiently low when judged from a welfare theoretical perspective. The hypothesis is thus that more centralised systems are more effective with regard to redistribution. Additionally, the point was made that more centralised systems produce more favourable results for socially disadvantaged groups, as they are more likely to withstand the opposition of the better-off lobby groups.⁶

In summary, from the arguments just presented there are two sets of hypotheses that ought to be examined with regard to the relationship of redistribution and the degree of centralisation: the first concerns the issue

³ Cf. Eardley et al. 1996a.

⁴ Cf. Schwager 1996, 1997.

⁵ Cf. e.g. Oates 1968, 1972, Pauly 1973, Wildasin 1991, 1994.

⁶ Cf. e.g. Bryson 1994.

whether more centralised systems concur with more redistribution, whereas the second relates to the hypothesis that more decentralised systems are more efficient in redistribution.

3 Degrees of Centralisation in European Social Assistance Schemes

3.1 Features of Centralisation in EU Social Assistance Schemes

To examine the relationship between distributive impacts and the degree of centralisation, we develop a system of classification suitable for grouping the systems into several classes according to specific features related to centralisation. While in socio-economic literature several attempts were made to classify welfare states in general,⁷ only a few studies focused on the systems of social assistance specifically, the most notable being Gough et al. (1997) and Gough (2001). To our knowledge, however, only one study⁸ employed quantitative methods for the development of classifications and none did any investigation focus on attributes relating to centralisation.

To form the basis for an empirical investigation of the hypotheses mentioned above, the administrative settings, regulations concerning funding liabilities, and decision responsibilities of the European schemes of social assistance in the EU15 countries except for Luxembourg, which had to be excluded for reasons of data availability, are investigated. Drawing on Eardley et al. (1996a, 1996b) and Gough et al. (1997), the main characteristics of the schemes investigated may be briefly summarised as follows (all information refers to the reporting year of 1995).

In *Austria*, social assistance is the sole responsibility of the provinces. Rules of eligibility as well as benefit levels vary between them. In general, there are no uniform procedures, and the granting of claims is highly discretionary. District authorities have further discretionary power: even if there are provincial regulations, these rules tend to provide only a broad framework within which district authorities are free to operate. There are no national benefit rates, but due to provincial settings there are nine different benefit levels.

⁷ Cf. e.g. Esping-Anderson 1990, Korpi/Palme 1998, Castles/Mitchell 1992, Kangas 1994.

⁸ Gough (2001)

In *Belgium*, funding of social assistance is provided half by national tax revenue and half by the municipalities. All minimum benefits have a national statutory framework. However, in some cases financial pressure on the poorer local authorities with the highest number of claimants has resulted in geographical inequalities in the treatment of applicants.

In *Denmark* the overall policy responsibility for social assistance lies with the central government. It is administered by the municipalities which have to operate within the guidelines set by the central government. Rates of social assistance have been fixed nationally. Municipalities retain an important element of discretion concerning specific one-off expenditure payments, but discretion has been reduced steadily with an increasing number of central directives on eligibility and benefit levels.

In *Finland*, social assistance is administered by municipal offices within general guidelines for conditions of eligibility set by the central government. Since the early 1990s, pressure from increasing unemployment has led to the abolition of many of the normative directives, leading to greater municipal discretion and increasing variation of treatment. As a result, in some locations there are more rigid enforcement and compliance procedures. Benefit levels are set nationally for two geographical categories according to cost of living, which differed by 4.4 percent in 1993.

In *France*, the principal assistance benefit for people of working age, the “Revenu Minimum d’Insertion” (RMI), is nationally regulated and mostly funded from the central state. Supplementary benefits for invalids etc. which are partly financed by contributions are delivered by local authorities. Theoretically benefits are not subject to administrative discretion and there is no variation in the amounts paid between the regions with the exception of overseas departments.

In *Germany*, social assistance is funded to 75 percent by municipalities and to 25 percent by the central government. Policy responsibility is held at the federal level, but the implementation is delegated to the Länder. Those in turn can delegate part of the administration to the district and municipal authorities, who have some discretionary powers. Benefit rates are set by the Länder within a narrow band fixed by federal law.

In *Greece*, there is no general, comprehensive scheme of social assistance but rather a number of categorical social assistance type provisions, which are characterised by fragmentation. There is no set of common criteria applying to the provision of benefits. Policy responsibility for most of the schemes is

exercised at a central level. Implementation is exercised at a regional level by the Prefectures.

In *Ireland*, national regulations set by the central government apply to all social assistance schemes, although local authorities have a limited degree of discretionary power. Rates of payments are set nationally by parliamentary decisions.

In *Italy*, there is no national system of social assistance, but only particular national means-tested programs for older and disabled people, coupled with local assistance schemes. The regions are permitted but not required to establish general frameworks for social assistance, and the extent to which they do varies markedly. Almost all benefits are administered locally and there are substantial variations between regions.

In the *Netherlands*, social assistance is funded to 80 percent by the central government. Regulations are set nationally, and policy responsibility is held by the central state. Administration is on a municipal basis exercised by social welfare departments. Benefits are standard national rates linked to the net minimum wage. New legislation that gives greater discretion came into effect in 1996.

In *Portugal*, no general system of social assistance existed in 1995. Instead, there are certain categorical benefits that resemble what is generally accepted to be social assistance (e.g. for invalids, elderly and orphans). For these categorical benefits, all rates are set nationally and administration is carried out by regional authorities.

In *Spain*, apart from a number of categorical benefits for specific groups (unemployed, elderly, invalids) there is a general minimum income scheme which is available to people of working age but is implemented in different ways by different regions. Regions set their own social assistance levels and benefit rates vary substantially between them.

In *Sweden*, most of the expenditures on social assistance is funded by local authorities. Social assistance is a general right to support, but the scheme is administered at a local level. Guidelines for the conditions of entitlement are set by the central government, but the responsibility for the interpretation and delivery of benefits remains with the municipality. There are nationally recommended standard rates, but actual rates may be quite different in different areas.

In the *UK*, social assistance is an integrated, nationally funded scheme with common rules of eligibility and common levels of payments. The basic

framework of social assistance is regulated by national law. The administration is largely carried out by the central government and through the Benefits Agency (BA) via its district offices. There is no discretionary of geographical variation in normal benefit rates in the UK.

3.2 A Classification of EU Social Assistance Schemes According to Centralisation

From the characterisation above it may be inferred that the main differences relate to the funding shares of the various federal levels, the assignment of formal decision competencies and the degree of uniformity of benefit levels over the nation state. Accordingly, using data from MISSOC (1995) and Eardley et al. (1996b), for the purpose of investigation we introduce a set of three indicators designed to depict the following features of social assistance schemes relating to centralisation:⁹

- An indicator for *funding liabilities*: This indicator is designed to capture the degree to which social assistance expenditures are financed by the central government, by regional authorities or federal states, or by the local authorities.
- An indicator for *formal decision responsibilities*: This indicator is constructed on the basis of information on the federal level at which basic-rate benefits are established (central government, federal states or regional authorities, local authorities).
- An indicator for *regional differences in benefit levels*: This indicator is designed to account for the degree to which benefit levels actually vary between regions.

In establishing classifications of welfare systems, quantitative methods were rarely employed. This is mainly due to the fact that statistical inference is impeded by the small number of observations that do not permit any sensible regression analysis. Instead, several heuristic and semi-quantitative investigations have been conducted. However, with all purely qualitative assessments there is the danger of misjudging class assignments by overvaluing

⁹ For further details on the indicators we refer to Appendix A.

highly conspicuous features on the cost of less obtrusive traits. A quantitative analysis of class assignments is therefore highly desirable.

As Kangas (1994) and Gough (2001) have suggested, cluster analysis may be the method of choice to determine class assignments in cases where regression analysis must be ruled out for lack of observations. Cluster analysis is a descriptive instrument of explorative data analysis designed to identify “natural groupings” of cases by simultaneously comparing multiple characteristics depicted by a set of input variables.¹⁰ To this end, measures of distances for the values of the input variables are computed. Subsequently, grouping algorithms are employed to classify the cases into groups. In so-called hierarchical methods, which are employed in the present investigation, the algorithm proceeds by a series of successive mergers, starting with individual objects and grouping them according to their similarities.¹¹

As cluster analysis is a tool of descriptive statistics, sources of error and variation are not formally considered. To check for the stability of the results, various clustering methods based on different distance measures and grouping algorithms should be conducted. In the present investigation, average linkage, Ward linkage and median linkage with quadratic Euclidean distances as well as average linkage with Minkowski(1) distances are run.¹² As in cluster analysis different scales of measurement may greatly affect the results, all variables are normalised to the range of [0;1].¹³ The analyses are conducted for the EU15 countries with the exception of Luxembourg that had to be excluded for reasons of data availability. As the reporting year, also for reasons of data availability with respect to the complementary empirical investigation presented in section 4 the year 1995 is chosen.

The results of cluster analyses are best illustrated graphically by so-called dendrograms.¹⁴ In these tree-diagrams, the clusters are represented by branches that merge together when junctions of clusters occur. The positions of these mergers along the distance axis indicate the level of the aggregate distance value at which cases are grouped together: mergers close to the left hand side of the

¹⁰ Cf. e.g. Johnson/Wichern 2002.

¹¹ Strictly speaking, this only applies for the so-called agglomerative hierarchical clustering methods. The (less common) divisive methods proceed by starting from a single cluster including all objects and successively assigning the cases to subgroups according to their dissimilarities.

¹² For technical details on these measures, see e.g. Johnson/Wichern 2002.

¹³ Since the Ward algorithm is based on the presence of differences in variances, which are cancelled out by the more common z-standardisation, the [0;1] standardisation is preferred.

¹⁴ Cf. e.g. Johnson/Wichern 2002.

dendrogram indicate that the respective countries are very similar, whereas mergers close to the right point to considerable dissimilarities. Accordingly, with respect to the case list on the left hand side of the diagram, cases are listed according to their similarity: countries exhibiting very similar characteristics are listed close to each other, whereas more differing countries appear further apart in the list. Consequently, from the successive junctions of the branches, groupings and sub-groupings exhibiting different levels of homogeneity may be identified.

Running the above mentioned four different methods of cluster analysis we obtain the dendrograms shown in figure 1a to 1d:

Rescaled Distance Cluster Combine

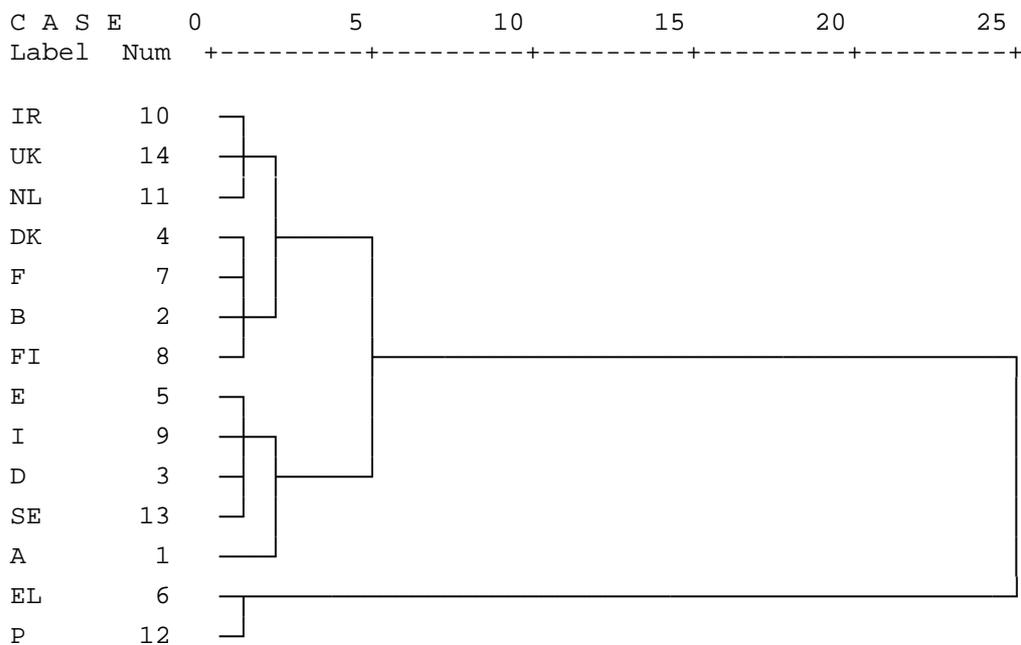


Figure 1a: Dendrogram, Average Linkage, Quadratic Euclidian Distance

Rescaled Distance Cluster Combine

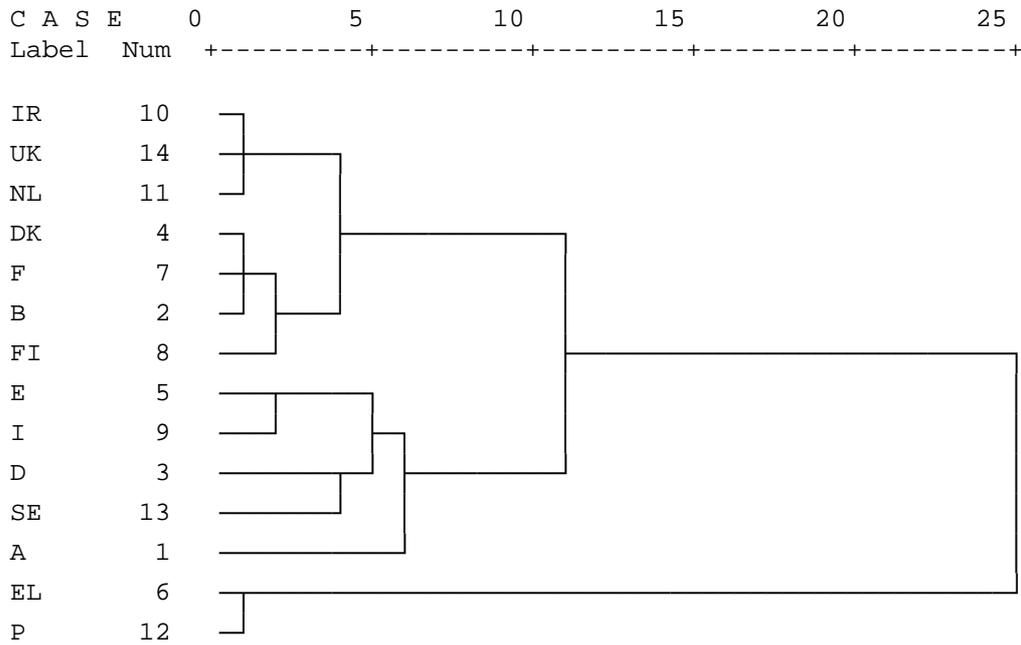


Figure 1b: Dendrogram, Average Linkage, Minkowski(1) Distance

Rescaled Distance Cluster Combine

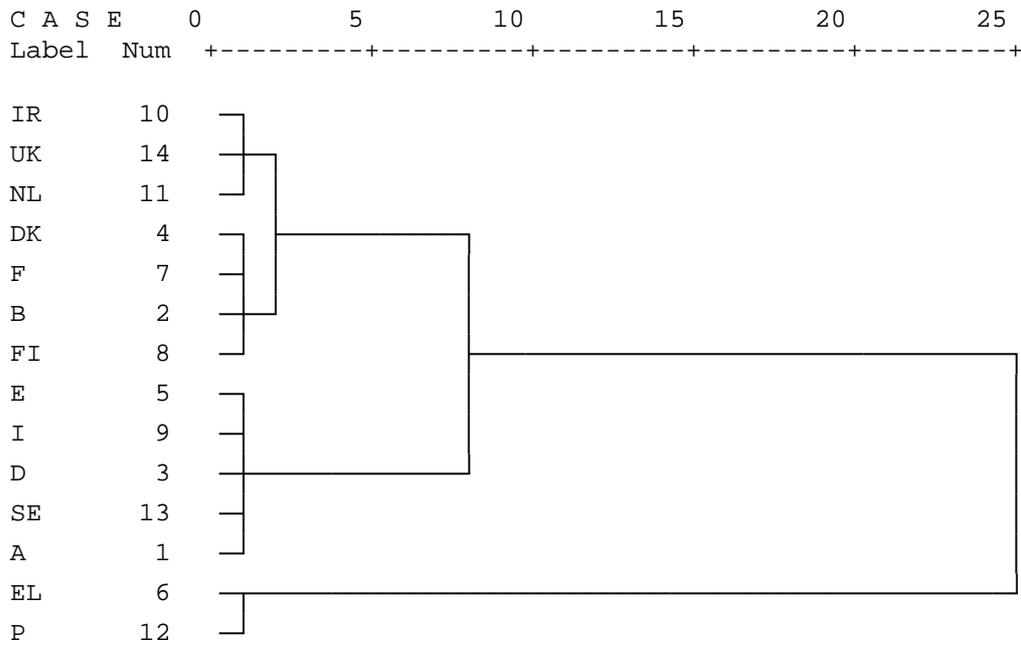


Figure 1c: Dendrogram, Ward Method, Quadratic Euclidian Distance

Rescaled Distance Cluster Combine

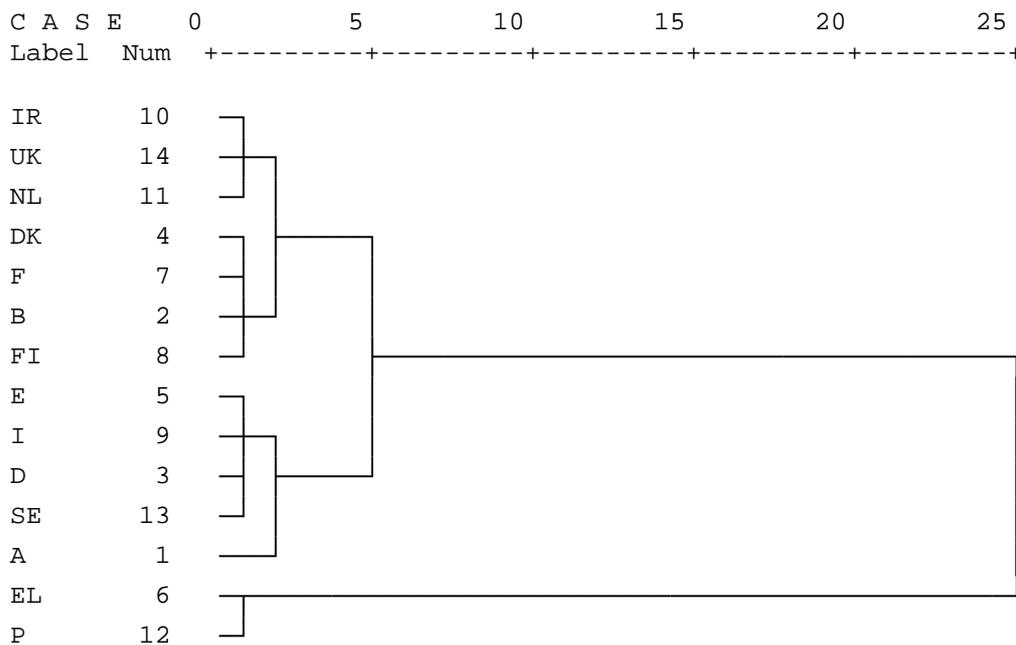


Figure 1d: Dendrogram, Median Linkage, Quadratic Euclidian Distance

As the dendrograms show, with respect to their degree of centralisation we may distinguish three broad categories of systems (apart from Greece and Portugal, where no nationwide system of social assistance existed in the reporting year 1995):

- The first group showing a comparatively high degree of decentralisation comprises Germany, Sweden, Spain, Italy and Austria. In these countries, benefits are funded by municipalities, benefit levels are established by regional or local authorities and vary across regions.
- In the second group, we find Belgium, Denmark, France and Finland. In these countries, benefit levels are set by the central government and are largely uniform across regions. Funding, however, is provided by regional or local authorities.
- The third group, which features the highest degree of centralisation, consists of Ireland, the United Kingdom, closely followed by the Netherlands. In these countries, benefit levels are established by the central government and are absolutely uniform across regions. In addition, benefits are funded (almost) completely by the central state.

As we can see, apart from a few minor changes of position within the first group, the obtained classifications prove valid for all clustering methods employed.

3.3 An Indicator of Centralisation for EU Social Assistance Schemes

The clear-cut results obtained by the cluster analyses suggest that an attempt may be justified to construct an *indicator of centralisation* by employing the above mentioned variables as an input for methods of multidimensional scaling (MDS). In contrast to cluster analysis the primary objective of MDS is to project the original multidimensional data into a co-ordinate system of less dimensions, such that any distortion through the reduction in dimensionality is minimised. Specifically, MDS techniques deal with the problem of finding a representation of the N cases investigated in few dimensions for a set of observed distances between every pair of the cases, such that the inter-item proximities match the original distances as closely as possible. If the actual magnitudes of the original distances are used to obtain the lower dimensional representation, the method is called *metric MDS*.¹⁵ In the case of ordinal data it is also possible to arrange the N cases using only the rank orders of the original distances but not their magnitudes. This method is referred to as *nonmetric MDS*.¹⁶

MDS techniques are calculated by various methods of algorithms that differ with respect to the distance measures employed and the loss function to be minimised. The loss function is defined with respect to a numerical measure of closeness to the original distances, which is called STRESS (STandardised RESidual Sum of Squares). Several measures relating to STRESS were proposed that differ mainly with respect to the manner deviations of proximities and original distances are introduced. The most common measures are STRESS(1) and STRESS(2) as defined by Kruskal and SSTRESS as defined by Takane, Young et al.¹⁷ In general, STRESS values below 0.05 are considered as a good, values below 0.025 as an excellent goodness of fit.

¹⁵ Cf. Johnson/Wichern 2002. This variant of MDS is also known as principal component analysis.

¹⁶ Cf. Johnson/Wichern 2002.

¹⁷ For a formal definition of these measures we refer to Johnson/Wichern 2002.

For the present investigation, since part of the variables cannot be considered as metric in a strict sense, nonmetric MDS is employed.¹⁸ Results are calculated by means of two different algorithms, ALSCAL and PROXSCAL, and in each case two different measures of distance, Euclidean distance and Minkowski(1) distance are used.¹⁹ Since MDS is chosen for the purpose of developing an indicator of centralisation, a reduction of dimensionality to one dimension is predetermined. The results of the four MDS techniques employed are listed in table 1 below:

PROXSCAL (Euclidean Distance)	PROCSCAL (Minkowski(1) Distance)	ALSCAL (Euclidean Distance)	ALSCAL (Minkowski(1) Distance)
IR -0.355	IR -0.351	IR -0.9911	IR -1.0036
UK -0.355	UK -0.351	UK -0.9906	UK -1.0036
NL -0.337	NL -0.335	NL -0.9205	NL -0.9307
B -0.305	B -0.309	B -0.6631	DK -0.6587
DK -0.305	DK -0.309	DK -0.6630	F -0.6587
F -0.305	F -0.309	F -0.6626	B -0.6586
FI -0.292	FI -0.293	FI -0.5594	FI -0.5466
D -0.253	D -0.256	D -0.0884	D -0.0944
A -0.229	A -0.230	A 0.2238	A 0.1939
SE -0.217	SE -0.214	SE 0.2369	SE 0.2621
I -0.196	I -0.192	I 0.3521	I 0.3710
E -0.179	E -0.178	E 0.4572	E 0.4756
P 1.663	P 1.663	P 2.1343	P 2.1261
EL 1.664	EL 1.664	EL 2.1344	EL 2.1261
STRESS I 0.00736	0.00664	0.04917	0.04284
STRESS II 0.00891	0.00804		
SSTRESS 0.00000	0.00000	0.01543	0.01112

Table 1: Results of nonmetric MDS

As can be seen in table 1, the results of the MDS analyses correspond with the classification obtained by the cluster analyses above. In all cases, the STRESS figures obtained indicate a good to excellent goodness of fit.

¹⁸ Results for metric MDS have also been calculated as an experiment for comparison. While different absolute values of the indicator resulted, rank orders obtained by nonmetric MDS proved stable in the case of metric MDS as well.

¹⁹ For technical and mathematical details on the algorithms used, see <http://www.spss.com/tech/stat/algorithms/11.0/proxscal.pdf> and <http://www.spss.com/tech/stat/algorithms/11.0/alscal.pdf>

The figures given in table 1 show the highest degree of centralisation for Ireland and the UK, followed closely by the Netherlands. In the upper middle group with a notable distance we find Belgium, Denmark, France and Finland which also constitute a separate group in the results of cluster analyses, followed by Germany, Sweden, Austria, Italy and Spain. Finally, Greece and Portugal with no nationwide system of social assistance in 1995 are listed at the bottom of the scale. With the exception of a single shift in rank orders between Belgium and Denmark/France in the ALSCAL-Minkowski(1) scale, all scales exhibit identical ranking of the systems.

4 Impacts of Social Assistance Payments on Poverty: Empirical Analysis

4.1 Analysis of Poverty Reduction: Effectiveness and Efficiency

We now turn to the empirical analysis of poverty reduction through social assistance payments. When analysing impacts of social transfers on poverty, the investigation is often limited to measuring the poverty of post-transfer income distributions.²⁰ As Castles and Mitchell (1992) pointed out, this approach does not do justice to the problem of assessing the effectiveness of social transfers with respect to poverty reduction. Especially when pre-transfer poverty varies greatly, a mere comparison of post-transfer poverty may yield a badly misleading image, as post-transfer poverty tells nothing about the magnitude by which the initial poverty has been reduced. Rather, the initial, pre-transfer poverty must be taken into account. As a consequence, the appropriate measure for assessing the effectiveness of poverty reduction is the percentage reduction of the poverty measure considered due to the payment of social assistance benefits, which is commonly referred to as the redistribution effect.

Effectiveness, however, is only one relevant dimension when comparing poverty reduction across social transfer systems in different countries. As a rule, we observe that the shares of social assistance expenditures in GDP vary substantially between the countries considered. Poverty reduction should therefore be judged in the light of the total amount of expenditure spent in social

²⁰ Cf. e.g. Morris/Preston 1986, EUROSTAT/European Commission 2000 and EUROSTAT 2000a and 2000b where poverty measures were calculated for post-transfer income.

transfers, an issue relating to the notion of distributive efficiency. A commonly adopted approach to measure efficiency in this context was suggested by Beckerman (1979a, 1979b). This approach is based on the aggregate poverty gap, which is the sum of the individual income shortfalls from the poverty line, and is thus limited to one poverty measure. As we want to enlarge our investigation to different measures of poverty which are often used in poverty analysis we suggest a set of measures of distributive efficiency that are constructed as follows. Dividing the redistribution effect of the respective poverty measure by the share of social assistance expenditure in GDP, we obtain a measure of distributive efficiency that expresses the amount of poverty reduction achieved by investing one percent of GDP in social assistance expenditure.²¹

One issue of interpretation concerning the idea of efficiency in the present context should be noted. Analysis of distributive efficiency deals with the question *which income groups* are beneficiaries of the social transfer payments. Distributive efficiency must therefore be distinguished from administrative efficiency, which deals with the question *which share* of the transfers actually reaches the recipients, rather than getting lost in the administrative process. Likewise, distributive efficiency has to be distinguished from allocative efficiency. In the latter case, adverse effects of social transfers on labour supply, savings behaviour and the trade off between equality and efficiency in general are the main areas of concern. We caution that distributive efficiency is an efficiency measure in the classical sense of relating outcome (poverty reduction) to input (social assistance expenditures) and tells nothing about the quality of social assistance schemes with respect to Pareto efficiency or other welfare economic concepts.

4.2 Data and Methodological Issues

The impact of social assistance benefits on poverty in selected European countries can be analysed on the basis of Luxembourg Income Study (LIS) data. The LIS database is a collection of harmonised household income surveys which

²¹ More specifically, the figure obtained is a measure of average efficiency. Of course, for issues of interpretation the possibility must be considered that poverty reduction may be subject to increasing marginal costs.

permit comparative studies for different countries.²² The latest available LIS data are included in wave IV which refers to 1994/95. For these years, the usable data refer to France, Italy, Germany, the United Kingdom and Finland.

The relevant definition for *disposable income (dpi)* used here is the yearly disposable income as defined by LIS,²³ net of pensions. Furthermore, we apply the concept of equivalent household income. This concept makes it possible to compare households of different sizes by dividing household income by the equivalent number of household members which is calculated applying an equivalence scale. This household equivalent income is then assigned to each household member.²⁴ Thus, economies of scale due to fixed costs in household consumption are taken into account.

The notion of poverty has manifold faces and can be captured by different concepts. We limit our analysis to a relative definition of income poverty:²⁵ a unit of analysis is poor if its income lies below a certain percentage of median adjusted disposable income. We apply a poverty threshold of 50 percent of median equivalent income (referred to as median in the following) which is commonly used in empirical research.²⁶ As this percentage of the median is a relatively arbitrary choice, for comparison we also apply an additional poverty line of 60 percent of the median²⁷ to check for the stability of the results. The following discussion of the results refers to the poverty threshold of 50 percent of the median; the results for the 60 percent of the median threshold are mentioned only if the resulting rank order of countries is affected.²⁸

When capturing poverty, two different aspects are of interest: first the incidence and second the intensity of poverty. The incidence of poverty deals with the question how many poor we find in a population, whereas the intensity of poverty points out how far the income of the poor is below the minimum threshold for the particular society.

²² For more information on the LIS data see <http://www.lisproject.org> and e.g. Smeeding 2002.

²³ See for definition of disposable income <http://www.lisproject.org/techdoc/summary.pdf>.

²⁴ The equivalence scale employed here is the square root of the household size. Cf. e.g. Buhmann et al. 1988, Biewen 2000: 3f, Atkinson/Rainwater/Smeeding 1995: 18ff for further information on equivalence scales.

²⁵ For concepts of poverty see e.g. Scheurle 1991 or Förster 1994 and for more information about other possibilities of defining a poverty line see e.g. Hagenaars 1986.

²⁶ See e.g. Förster 2000: 66 or Krämer 1997: 12 who state that 50 percent of median is a standard threshold.

²⁷ This poverty line is used by EUROSTAT, see e.g. EUROSTAT 2000b.

²⁸ The detailed results for the poverty line of 60 percent of the median are included in Appendix C.

As has been noted throughout the literature, different measures of poverty may assess a given income distribution differently. Accordingly, in order to obtain a reasonable picture, four different poverty measures have been applied.²⁹ Most common is the headcount ratio which is a measure of the incidence of poverty as it gives the share of poor in the considered population. The headcount ratio is reported for the sake of completeness because it is the most popular measure of poverty. However, we caution that this measure is of limited value when judging the impacts of benefits on poverty alleviation, since it does not evaluate the extent to which incomes fall below the poverty line in the pre- and post-transfer situation. This aspect is taken into account by the three other measures used, the poverty gap ratio (PGR), the measure FGT2 and the Sen index of poverty, which focus on the intensity of poverty. The PGR is based on the aggregate poverty gap which is the sum of the individual income shortfalls from the poverty line. The PGR gives the ratio of the actual aggregate poverty gap of the analysed income distribution and the maximum aggregate poverty gap that would result if all incomes were zero. The third measure employed is FGT2 which implies a higher sensitivity to high poverty gaps than the other mentioned measures as it gives the average squared normalised poverty gap.³⁰ Finally, the poverty index of Sen (1976) is applied. It captures not only the incidence and intensity but also the inequality of the income distribution of the poor.

To take differences in social assistance budgets into account, apart from the redistribution effect as a measure of effectiveness the corresponding figures for distributive efficiency as defined in section 4.1 are calculated. Unfortunately, reliable data on social assistance expenditures suitable for inter-country comparisons are unavailable for the reporting year of 1995.³¹ Accordingly, data provided by Gough et al. (1997) referring to the reporting year of 1992 had to be employed. Consequently, we caution that the efficiency figures calculated are

²⁹ For more information about the measures applied see e.g. Foster et al. 1984, Seidl 1988 or Hagenaars 1986 and Appendix B.

³⁰ FGT2 is a special case of the Foster/Greer/Thorbecke family of measures which is characterised by a parameter α that indicates the sensitivity in the lowest income regions: $\alpha=0$ is the headcount ratio, $\alpha=1$ is the PGR and $\alpha=2$ indicates the highest sensibility in the lowest income regions of these three measures. See Appendix B for more details.

³¹ Data provided by regularly published EUROSTAT statistics do not include the category of social assistance as defined by MISSOC, but only a subcategory named „social exclusion“ which is not congruent with the notion of social assistance used here. In MISSOC, by contrast, data on social assistance expenditure are unavailable for Italy, while for some of the remaining countries only estimates referring to different reporting years are provided.

not to be taken as an exact measure of distributive efficiency but rather as an indicator variable that points to the relative efficiency of the social assistance schemes considered.

In most countries, housing benefits are granted as a supplement to social assistance payments. However, since the degree of integration of housing benefits with social assistance as well as housing costs varies across countries, excluding housing benefits from the analysis may distort comparisons.³² Accordingly, to complete the picture, impacts on poverty of social assistance plus housing benefits are also calculated for the poverty line of half of the median and compared to the results obtained for social assistance payments alone.

4.3 Results on Distributive Effectiveness and Efficiency

To analyse the impact of social assistance on poverty, the four measures presented above are calculated for *disposable income* and *disposable income less social assistance* for each country. As we intend to investigate the influence of social assistance on poverty, we apply the poverty line calculated for *disposable income* also for *disposable income less social assistance*. In order to compare the effects of social assistance in the different countries, the percentage reduction of the values of the applied measures for *disposable income less social assistance* to *disposable income* is computed. The results obtained are shown in figure 2 a to 2 d:

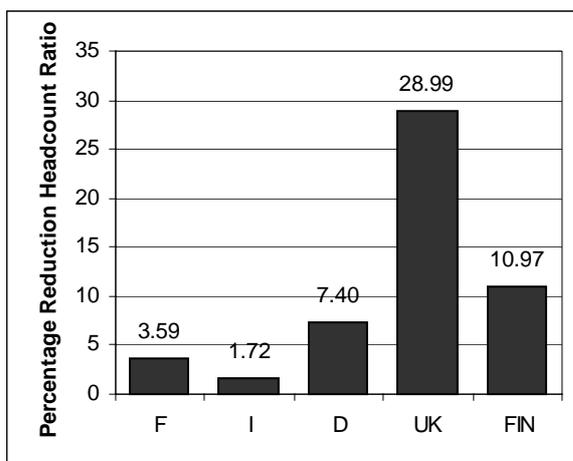


Figure 2 a: Percentage reduction headcount ratio

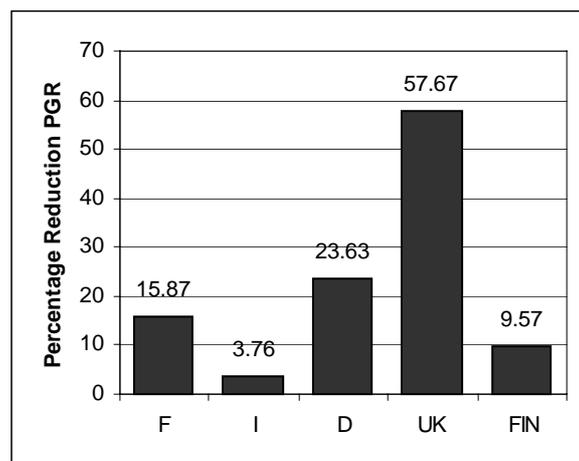


Figure 2 b: Percentage reduction PGR

³² Cf. Gough et al. 1997: 20.

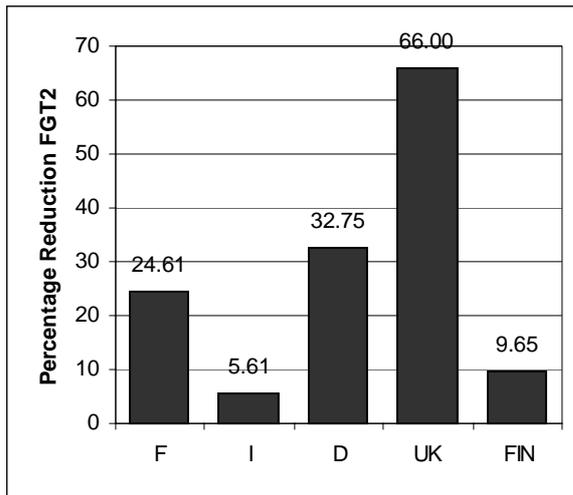


Figure 2 c: Percentage reduction FGT2

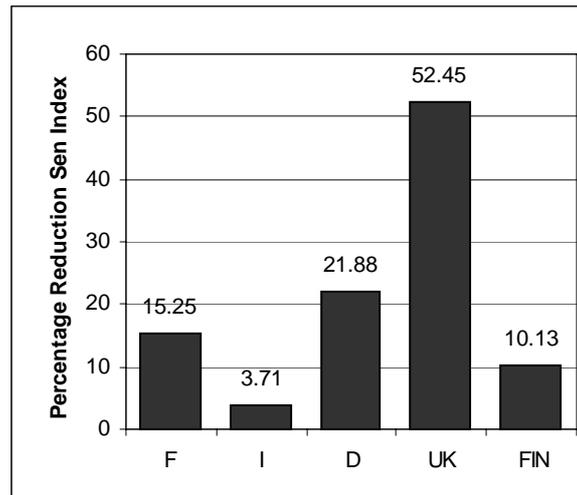


Figure 2 d: Percentage reduction Sen index

The diagrams show that in the UK social assistance has clearly the strongest impact on poverty values for all measures investigated. The rank positions of the other countries depend on the poverty measure applied: the PGR, FGT2 and the Sen index all give an unambiguous ranking with Germany showing the second highest reduction numbers, followed by France, Finland and last Italy. The headcount ratio gives a different picture with Finland on the second best place followed by Germany, France and Italy. Since the headcount ratio is the only measure that takes into account merely the incidence but not the intensity of poverty, it may be inferred from these results that the French and German systems are more effective in the reduction of intense poverty than the Finish system.

The results described above take only account of the percentage reduction of poverty after social assistance. They neglect the fact that this poverty reduction is obtained at different expenditure levels for this transfer. Changing the focus from distributive effectiveness to efficiency of social assistance by dividing the percentage reduction as defined above by the share of social assistance expenditures in GDP,³³ we obtain the results displayed in figure 3 a to 3 d:

³³ As noted above, as suitable data on social assistance expenditures are unavailable for the reporting year of 1995, the data provided by Gough et al. (1997) referring to the reporting year of 1992 had to be employed. Specifically, the data provided under the category [1]: General Assistance in Gough et al. (1997) were employed for calculations on social assistance alone. For calculations including housing benefits expenditures listed in category [3]: Housing Assistance were added. Cf. Gough et al 1997: 25.

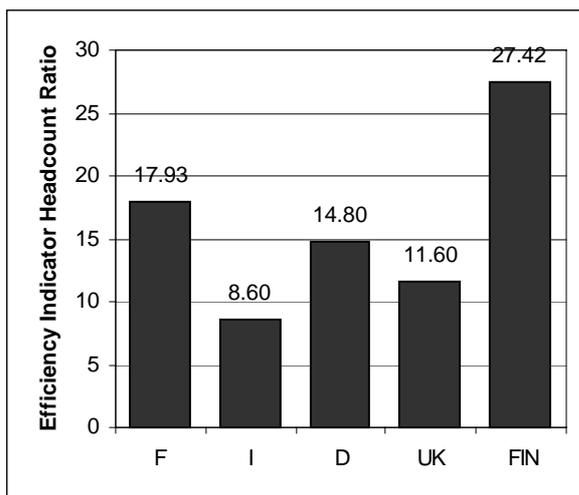


Figure 3 a: Efficiency values headcount ratio

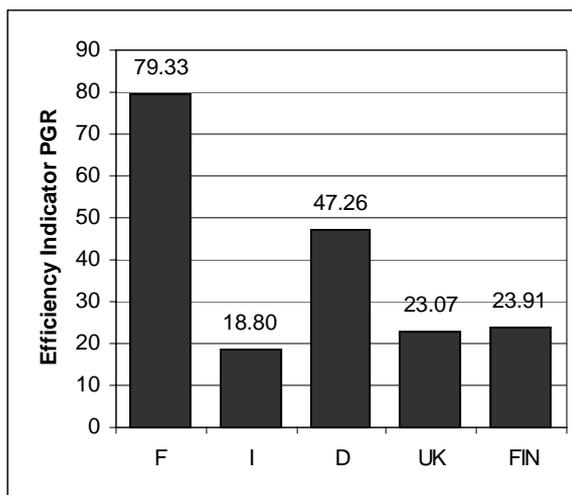


Figure 3 b: Efficiency values PGR

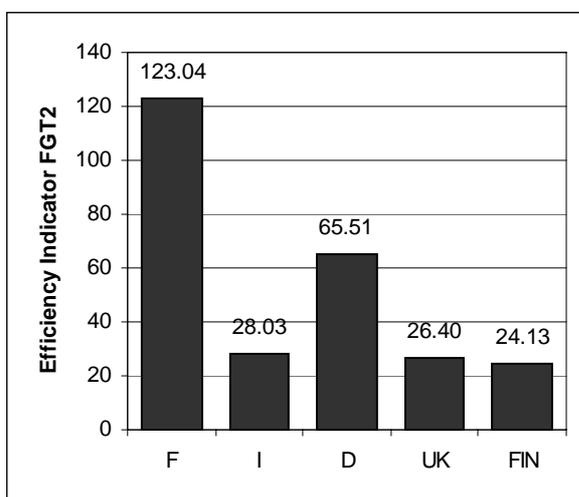


Figure 3 c: Efficiency values FGT2

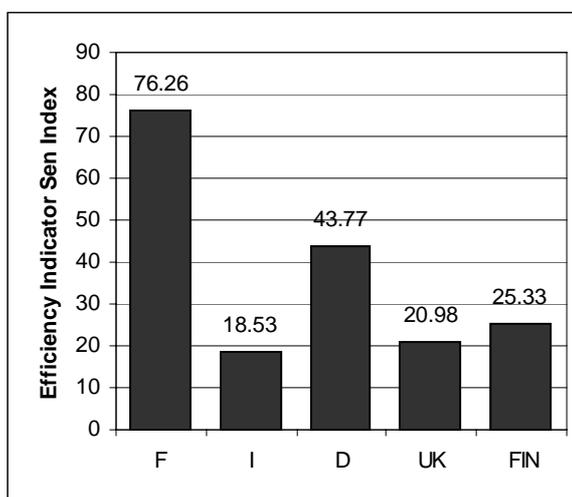


Figure 3 d: Efficiency values Sen index

We find that taking the social assistance budget into account considerably changes the rank positions of the countries, depending on the measure applied.

The PGR, FGT2 and the Sen index yield quite similar results. France, that took the third position with respect to effectiveness performs best for efficiency which reflects its low expenditures for social assistance. The second position is held by Germany. For the remaining countries PGR and the Sen index result in different ranks than FGT2: with the PGR and the Sen index Finland is followed by the UK and Italy, whereas FGT2 places Italy on the third, the UK on the fourth and Finland on the last position. However, we caution that the efficiency numbers for Finland, the UK and Italy are close together for all of these three measures. For the sake of completeness, we add that efficiency calculations based on the headcount ratio show different ranks for the countries: in this case, Finland clearly performs best, while France, that holds the best position for the

other applied measures, has the second best result followed by Germany, the UK and Italy. As in the case of effectiveness, the vastly diverging results for Finland (top position with headcount ratio, last position with FGT2) leads one to suppose that the Finnish system places more importance to reducing poverty incidence than e.g. the French and German systems.

When applying the alternative poverty line of 60 percent of the median, we find different results for FGT2 and the headcount ratio. The results for FGT2 show interchanged rank positions of Finland (third best now) and Italy that falls back to the last place when compared with results for the 50 percent median poverty line. With respect to the headcount ratio Italy and Germany switch places which means that Germany is least efficient when judged with reference to the 60 percent of median threshold. These variations in the rank orders are quite understandable, since the efficiency numbers calculated with a threshold of half of the median are also quite close together for these three countries.

To summarise, it is clear that when taking the size of the social assistance budget into account, the distributive impacts yield a very different picture. In particular, considering the UK, the impressive results with respect to effectiveness cannot compensate for the comparatively high social assistance budget. By contrast, especially the French system with its lower expenditures for social assistance improves its position when compared to the calculations for effectiveness. Germany can hold its second position for the PGR, FGT2 and the Sen index, but for the headcount ratio the picture is not that clear as the application of the poverty threshold of 60 percent of the median yields different results. Finland's performance strongly depends on the measure applied: as in the case of effectiveness results for the headcount ratio are considerably better than the figures obtained for PGR, FGT2 and the Sen Index. With regard to Italy, efficiency figures are the lowest with all measures except for FGT2, pointing to the fact that the low level of social expenditure cannot compensate for the weak results in distributive effectiveness.

The results of the calculations carried out for social assistance with and without housing benefits³⁴ are shown in direct comparison in table 2 and 3.

³⁴ This means that the effectiveness and efficiency figures are calculated on the basis of *disposable income less the sum of social assistance and housing benefits* and the expenditure figures for social assistance and housing benefits as indicated in table 2 and 3.

	France	Italy ³⁵	Germany	UK	Finland
Headcount ratio					
dpi – social assistance	3.59	1.72	7.40	28.99	10.97
dpi – (social assistance + housing benefits)	22.56	-	10.13	34.03	23.52
Poverty Gap Ratio					
dpi – social assistance	15.87	3.76	23.63	57.67	9.57
dpi – (social assistance + housing benefits)	34.15	-	30.00	69.82	18.48
FGT2					
dpi – social assistance	24.61	5.61	32.75	66.00	9.65
dpi – (social assistance + housing benefits)	42.96	-	41.32	80.65	16.42
Sen index					
dpi – social assistance	15.25	3.71	21.88	52.45	10.13
dpi – (social assistance + housing benefits)	33.90		28.13	65.20	19.61

Table 2: Effectiveness measures for social assistance and housing benefits (poverty line half median)
dpi: disposable income

³⁵ The variable including housing benefits is not available for Italy in the LIS dataset, since only a few Italian regions provide specific housing benefits mainly for elderly people.

	France	Italy	Germany	UK	Finland ³⁶
Headcount ratio					
dpi – social assistance	17.93	8.60	14.80	11.60	27.42
dpi – (social assistance + housing benefits)	22.56	-	14.48	9.20	-
Poverty Gap Ratio					
dpi – social assistance	79.33	18.80	47.26	23.07	23.91
dpi – (social assistance + housing benefits)	34.15	-	42.85	18.87	-
FGT2					
dpi – social assistance	123.04	28.03	65.51	26.40	24.13
dpi – (social assistance + housing benefits)	42.96	-	59.03	21.80	-
Sen index					
dpi – social assistance	76.26	18.53	43.77	20.98	25.33
dpi – (social assistance + housing benefits)	33.90	-	40.19	17.62	-

Table 3: Efficiency measures for social assistance and housing benefits (poverty line half median)

dpi: disposable income

As expected, the effectiveness figures are generally higher because an additional transfer is included in the present calculations. With regard to the rank order, the only change observable is the switching of positions of France and Germany for all measures applied.³⁷ This is probably due to the considerable difference in recipient numbers for these benefits in the two countries: while in France 8.8

³⁶ Expenditures for housing benefits are not available for Finland in Gough et al 1997.

³⁷ Unfortunately, data on the budget for housing benefits are not available for Finland. If they were available and included, it is likely that the ranking for efficiency would differ a little bit from the one we present here

percent of the population receive housing benefits and 1.1 percent social assistance benefits, in Germany 2.8 percent are recipients of housing benefits and 4.5 percent receive social assistance.³⁸ Consequently, effectiveness figures in France are improved a lot more by adding housing benefits than this is the case for Germany.

Considering the results for distributive efficiency, rank positions remain unchanged in comparison to the case without housing benefits only for the headcount ratio. By contrast, with respect to the other three measures, France and Germany change places, implying that France no longer takes the top position which is now held by Germany. The better performance in efficiency of Germany may be explained by the low additional expenditures for housing assistance, especially when comparing them to the French costs for housing benefits, where expenditures are four times as high as the budget for social assistance alone. The UK, where the expenditures for housing benefits are higher than even the French costs for social assistance and housing benefits taken together, keeps the position after Germany and France.

To summarise, the effectiveness and efficiency indicators based on FGT2, the poverty gap ratio and the Sen index yield quite similar rankings of the countries considered. The most remarkable differences appear for the headcount ratio, which only records if someone is poor or not independently of the severity of poverty. Thus, it is a very simple measure which does not register if a poor receives social assistance but stays under the poverty line despite he or she could improve his/her situation. The other applied measures all include these differences and are therefore more appropriate to reflect the situation of the poor in a society.

5 Reduction of Poverty and the Degree of Centralisation: An Evaluation

The results just presented offer some interesting evidence with respect to the hypotheses on the relationship between the degree of centralisation of social assistance schemes and their impact on poverty alleviation. Let us first turn to the relationship between centralisation and the extent to which redistribution occurs. The relevant figure is the percentage reduction of initial poverty by means of social assistance, i.e. the effectiveness of redistribution. As the figures

³⁸ Cf. Eardley et al. 1996a.

in table 2 show, the rank order for all effectiveness measures with the exception of the headcount ratio is UK, Finland, Germany, France and Italy, with the UK achieving the highest and Italy the lowest effectiveness. When comparing these results to the conclusions drawn from the cluster analyses and MDS, the following picture appears. The UK that has clearly the most centralised system within the five countries considered here, also achieves the highest figure with regard to effectiveness. Conversely, Italy, that has the most decentralised system, just as clearly exhibits the lowest effectiveness. The remaining countries are listed quite closely together in the MDS scales, while in cluster analyses Germany is found in a more decentralised group than Finland and France. Accordingly, with respect to the hypothesis to be examined there is some evidence that extremely centralised countries are more effective with regard to redistribution than extremely decentralised countries. However, for systems with a medium degree of centralisation (Germany, Finland, and France), the results do not seem to support the hypothesis that greater centralisation leads to more effectiveness, since Germany, that has the most decentralised system of the three, has clearly the highest effectiveness figures for all measures with except from the headcount ratio.

Concerning efficiency, the picture is more complicated. It may be stated that with all measures except for FGT2, the most centralised and the most decentralised systems, UK and Italy, take the two last positions in the efficiency ranking. The countries with a medium degree of centralisation, Finland, France, and Germany seem to do better with regard to efficiency than either extremely centralised or extremely decentralised systems. This applies for all measures except for FGT2, where Italy performs better than either Finland or the UK. Moreover, comparing France with the more decentralised German system, with all measures investigated the French system performs more efficiently than the German system. Accordingly, no support seems lent to the hypothesis that a higher degree of decentralisation is accompanied by a better distributive efficiency. Rather, the results seem to suggest that systems with a medium degree of decentralisation do better with regard to efficiency than either extremely centralised or extremely decentralised systems.

We wish to caution that in interpreting these results it must be borne in mind that there are other differences in the set-up of the social assistance schemes which may influence their effectiveness and efficiency in redistribution. In particular, differences in regulations concerning degrees of coverage, conditions

for eligibility and the like may cause differences in redistributive effects that are only indirectly related to the degree of centralisation, if at all.

6 Conclusion

In this paper, the linkage between social assistance arrangements in the European Union, their degree of centralisation and poverty effectiveness and efficiency was examined. After presenting some prominent hypotheses on this relationship and briefly summarising the main aspects relating to centralisation in European schemes of social assistance, a set of indicators was introduced for the purpose of operationalising characteristics of centralisation for quantitative analyses. Subsequently, to classify the European schemes of social assistance according to their degree of centralisation, these indicators were used as input variables in several methods of cluster analyses and multidimensional scaling. By means of cluster analyses, we identified three broad categories of countries exhibiting a high, medium and comparatively low degree of centralisation, respectively. Apart from Greece and Portugal, where no nationwide system of social assistance existed in 1995, UK, Ireland and the Netherlands were classified as highly centralised, Belgium, Denmark, France and Finland as medium centralised and the remaining countries as comparatively highly decentralised. Employing the indicators as input variables for multidimensional scaling, a scaling of countries according to their degree of centralisation was developed that concurs with the classification obtained through cluster analyses.

Subsequently, for five selected European countries an empirical analysis of poverty effectiveness and efficiency using several measures of poverty was carried out. Concerning effectiveness, the results showed the highest influence of social assistance for the UK, whereas the Italian social assistance scheme does not perform well in reducing poverty. When taking the expenditures for social assistance benefits into account, we observe a different picture: the UK falls back to the next to last position for all poverty measures applied. Italy remains on one of the last positions, whereas France occupies the top position for three out of four poverty measures now. If housing benefits are included, France cannot hold its first place for efficiency because of the comparably high budget for housing benefits.

Finally, in the light of the results from classifications and empirical analysis the relationship between the systems' degree of centralisation and their success

in alleviating poverty was evaluated. Concerning effectiveness in poverty alleviation, the results provide some evidence that extremely centralised systems are more effective with regard to redistribution than extremely decentralised schemes. However, for systems with a medium degree of centralisation, the hypothesis that greater decentralisation leads to more effectiveness is not supported. With respect to efficiency, no support is lent to the hypothesis that a higher degree of decentralisation is accompanied by a better distributive efficiency. Rather, the results seem to suggest that systems with a medium degree of decentralisation do better than either extremely centralised or extremely decentralised systems.

We have to remark here that there are other goals of social assistance schemes besides reducing poverty. One other important objective is reducing inequality.³⁹ Perhaps even more important is the issue of social exclusion, which is related to the presence of long-term unemployment, welfare dependency and increasing social division. When interpreting results on redistributive effectiveness and efficiency, a complementary investigation of social mobility and social exclusion is therefore highly desirable.

³⁹ This aspect was analysed in Hölsch/Kraus 2002 who stated that a medium degree of centralisation is connected with better results in terms of efficiency.

Appendix A: Indicators for Classification According to Degree of Centralisation

The following indicators are used as input variables for the cluster analyses concerning the degree of centralisation:

1. *An indicator for funding liability:*

This indicator captures the degree to which social assistance expenditures are financed by the central government, by regional authorities/federal state or by local authorities. For this purpose, three partial indicators are constructed that recorded the percentage to which expenditures are funded by the central government (I1), by regional authorities/federal states (I2) or by local authorities (I3). The overall indicator (I) is calculated according to the formula $I=(3*I1 + 2*I2 + I3)/6$.

2. *An indicator for formal decision responsibility:*

This indicator reflects the federal level (central government, federal states or regional authorities, local authorities) at which basic-rate benefits are established. Using information from MISSOC (1995), countries are classified into five categories and assigned the integer values 1 to 5, depending on whether there was no nation wide system at all (1) or regular benefit levels were established by local authorities (2), regional authorities or federal states (3), local or regional authorities were bounded through nationwide coordination (4) or benefit levels were established by the central government (5).

3. *An indicator for regional differences in benefit levels:*

This indicator captures the degree to which benefit levels actually vary between regions. Data on the percentage variation are given in MISSOC (1995) for all countries with the exception of Finland and Sweden, where benefit levels differ regionally according to costs of living. For these two countries, data refer to the information given in Eardley et al. 1996b.

The values of the indicator variables, normalised to [0;1], are given in the table below. Countries are listed in descending order.

indicator for funding liability		indicator for formal decision responsibility		indicator for regional differences in benefit levels	
IR	1,00	B	1,00	B	1,00
UK	1,00	DK	1,00	DK	1,00
NL	0,93	F	1,00	F	1,00
B	0,67	FI	1,00	IR	1,00
DK	0,67	IR	1,00	NL	1,00
F	0,67	NL	1,00	UK	1,00
A	0,65	UK	1,00	D	0,95
FI	0,61	D	0,75	FI	0,95
D	0,42	SE	0,75	I	0,85
E	0,33	A	0,50	E	0,75
I	0,33	E	0,50	SE	0,70
SE	0,33	I	0,50	A	0,70
EL	0,00	EL	0,00	EL	0,00
P	0,00	P	0,00	P	0,00

Appendix B: Poverty Measures

With

n	number of households considered
q	number of poor households considered
y_i	income of i-th household
μ	arithmetic mean of income
z	poverty line,

the *headcount ratio* is defined as

$$H = \frac{q}{n}$$

The headcount ratio gives the share of households which are considered to be poor. These households are reported as poor if their income lies under the poverty line and it does not matter *how* poor they are. It is limited to a range of [0;1]. This measure is very simple and it has the disadvantage that it does not measure the effect of transfers that do not lift poor households above the poverty line.

The *poverty gap ratio (PGR)* is defined as

$$P = \frac{\sum_{i=1}^q (z - y_i)}{nz}$$

It is based on the aggregate poverty gap which is calculated as $\sum_{i=1}^q (z - y_i)$. The PGR gives the ratio of the actual aggregate poverty gap and the aggregate poverty gap if all incomes were zero. Thus, this measure points out *how poor* a unit of analysis is and not only *if* it is poor.

The family of *Foster/Greer/Thorbecke measures (FGT)* is defined as

$$FGT_{\alpha} = \frac{1}{nz^{\alpha}} \sum_{i=1}^q (z - y_i)^{\alpha} = \frac{1}{n} \sum_{i=1}^q \left(\frac{z - y_i}{z} \right)^{\alpha}, \quad \alpha \geq 0$$

This family of measures was introduced by Foster, Greer and Thorbecke (1984). They constructed it as additively decomposable under consideration of welfare aspects. It gives a normalised weighted sum of the income shortfalls of the poor. The parameter α is a “poverty aversion parameter”, its magnitude determines the weight assigned to downward deviations from the poverty line. The higher the value of α , the higher the importance attributed to the “poorest of the poor”. With $\alpha=0$, the headcount ratio is obtained which ignores the income shortfalls completely, $\alpha=1$ results in the poverty gap ratio. The third applied measure in this study is the FGT measure for $\alpha=2$ which indicates a higher sensitivity in the lowest income regions than the other two measures.

The *Sen index* is defined as

$$S = \frac{2}{(q+1)nz} \sum_{i=1}^q (z - y_i)(q+1-i)$$

Sen (1976) introduced this index with the intention of capturing the aspects of incidence, intensity and inequality of the income distribution of the poor in one measure. This measure weights the income shortfalls with the rank orders of the poor: the poorer someone is, the higher the weight attached to his income shortfall. The Sen index can take on values in $[0;1]$, where the lower bound of 0 applies in the case when all incomes are higher than the poverty line. The index is sometimes criticised because it is not clear how much is contributed to the end value by each of the three integrated aspects of poverty.

Appendix C: Results for Poverty Line 60 Percent of Median

	France	Italy	Germany	UK	Finland
Headcount ratio	1.71	1.28	2.60	14.15	8.87
PGR	10.66	2.89	16.31	45.80	9.78
FGT2	19.06	4.43	26.69	59.54	9.72
Sen index	10.95	2.88	16.06	42.38	9.33

Table A1: Poverty reduction figures for a poverty line of 60 percent of median

	France	Italy	Germany	UK	Finland
Headcount ratio	8.57	6.41	5.20	5.66	22.18
PGR	53.30	14.43	32.61	18.32	24.44
FGT2	95.28	22.15	53.38	23.82	24.30
Sen index	54.74	14.38	32.11	16.95	23.31

Table A2: Poverty efficiency figures for a poverty line of 60 percent of median

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