Non-Technical Summary

The present paper examines the linkage between social security strategies and redistributive effects in European social transfer systems. It is argued that the various European systems produce different patterns of redistribution that may be explained by the adoption of different mixes of social security strategies. These, in turn, reflect the enduring influence of the three major European social security traditions (the poor law tradition, the social insurance tradition, and the welfare state tradition).

In support of this argument, several ideal-typical strategies of social security are identified, traced back to their traditional roots and discussed from the viewpoint of economic, sociological and political arguments. Subsequently, a classification of European social transfer systems is introduced, reflecting the mixture of the social security strategies employed. For this purpose, a set of indicators depicting different aspects of social security strategies is invoked. Using these indicators as input variables, various cluster analyses are carried out. The results indicate that European social transfer systems may be classified into four broad regimes to which most of the systems may be assigned fairly clearly.

Finally, the linkage between the class assignment of the European social transfer systems and the redistributive patterns they produce is investigated. To assess the overall redistributive effects, three measures for distributive efficiency based on the Gini Coefficient, the quintile relation and the percentage of households below the low income threshold of 60% of median equivalized income are calculated. We find that the results vary greatly not only between systems but also between different measures calculated for a given system, indicating that different systems may affect the various income groups differently. Consequently, the redistributive impacts across income quintiles are investigated. We find that the redistributive effects for the various countries show characteristic profiles that reflect the class assignments identified in our cluster analyses. The patterns are strikingly similar for countries belonging to the same cluster but differ markedly between groups. We conclude that the redistributive effects clearly reflect the cluster assignment of the social transfer systems, indicating that the redistributive pattern is heavily influenced by the mixture of social security strategies employed.

Social Security Strategies and Redistributive Effects in European Social Transfer Systems

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Abstract

This paper evaluates the linkage between social security strategies and redistributive effects in EU social transfer systems. It is argued that the various European systems produce different patterns of redistribution that may be explained by the adoption of different mixes of social security strategies. In support of this argument, several ideal-typical strategies are characterized and a classification of European social transfer systems is introduced. Subsequently, the redistributive effects of the systems are assessed and the relationship to their class assignment is investigated. We conclude that the redistributive effects differ markedly between systems of different classes, indicating that redistributive patterns are heavily influenced by the adopted strategy mix.

JEL: I32, I38, H53
Keywords: European Social Security Systems, Classification, Redistribution

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1 Introduction

In view of the growing expenditures on social security, the question arises in how far social security programs actually achieve their goals of removing poverty, inequality and insecurity of existence. While discussions have frequently centred on the possible adverse effects of modern welfare states on the economy's *productive* efficiency, the present issue concerns the *distributive* efficiency of the social security systems themselves, which is closely connected to the question of how benefits are allocated to different income groups.

In socio-economic literature, several attempts have been made to explore the linkage between the effort spent in social security systems, their instruments and their distributive outcomes. Until the influential contribution of Esping-Anderson (1990), however, most empirical research has focused on comparisons between the total amount of social security expenditures. In view of the manifold nature of social security regulations, assessments on the sole basis of expenditure level are not sufficient to explain the multi-faceted aspects of the redistributive outcomes they produce.[1] Rather, a multidimensional approach should be adopted, taking into account not only the magnitude of social security funds but also the instruments that are employed to allocate social security benefits to their target population.

Drawing on previous studies that have examined the relationship between welfare state regimes and their distributive outcomes from a more general point of view,[2] the present paper discusses the linkage between social security strategies and redistributive effects in European social transfer systems. Specifically, we focus on the redistributive impacts of expenditures for monetary social transfers other than pensions (T^{op}) in the EU.[3] It is argued that the various systems produce different patterns of redistribution that can be explained by the adoption of different mixes of social security strategies. In section 2, after tracing the traditional roots of European social security systems, three ideal-typical strategies of social security are identified, defined with respect to their characteristic features and discussed from the viewpoint of economic, political and sociological arguments. In section 3 a classification

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1 Cf. e.g. Castles/Mitchell 1992: 3 ff., Kangas 1994: 347.

2 See, especially, Esping-Anderson 1990, Castles/Mitchell 1992 and Korpi/Palme 1998.

3 Following EUROSTAT 1999a, pensions include age and survivors pensions. T^{op} are restricted to monetary payments and do not include benefits in kind.

system for European social transfer systems is introduced that reflects the mixture of social security strategies employed. For this purpose, we invoke a set of indicators designed to capture the main characteristics of the various social security strategies. Employing these indicators as input variables, several methods of cluster analyses are conducted to classify the social transfer systems in the EU according to similarity. We identify four broad regimes, to which most of the European systems may be assigned fairly clearly. In section 4, the linkage between the class assignment of the social transfer systems and their redistributive effects is investigated. Using data provided by a recent EUROSTAT investigation[4], we find that the redistributive effects clearly reflect the class assignment established in section 3, indicating that the redistributive pattern of social transfer systems is heavily influenced by the adopted mixture of social security strategies and reflects the enduring impact of the three basic social security traditions in Europe.

2 Social Security in Europe: Traditions and Strategies

Starting from the early 16th century, various traditions of social security have evolved in Europe, gradually forming ideas and strategies as to how different social problems may be approached. Drawing on the work of Dixon (1999)[5], three social security traditions that are particularly important for Europe may be identified and referred to as the poor law tradition, the social insurance tradition and the welfare state tradition.[6] The *poor law tradition* originates from the secularization of poor relief stated explicitly in the English Poor Law Acts from 1598 and 1601. Rooted in economic liberalism and Christian values[7], the poor laws adhered to the principle of individual responsibility and work ethics. Distinguishing between "deserving poor" ("poor by acts of god", such as

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4 Cf. EUROSTAT 1999a.

5 Cf. Dixon 1999: 41 ff.

6 An "employer-liability-tradition" may be added, which originates in medieval landlordism and Marxist roots and was significant in the former socialist countries of Eastern Europe. In this tradition the employer was considered responsible for social security and its funding. Social security for workers was considered a legal right which was primarily distributed according to past work histories, whereas no benefits were to be provided for anyone capable of self-support through work. Cf. Dixon 1999: 45 ff., 59 ff.

7 On the role of religion for the evolution of social security cf. e.g. Higgins 1981, Ch. 5.

orphans, aged, long-term disabled) and "undeserving poor" ("poor by personal attributes", such as vagabonds, rioters and able-bodied poor in general), local government poor law overseers were appointed to provide poor relief to the incapacitated, send able-bodied to work and punish vagrants and beggars. With the poor laws, social security was considered a necessary evil rather than an legitimate function of the state, being associated with stigma, deterrence and inhuman workhouse conditions.

The *social insurance tradition* evolved as a reaction to the poor law experiences and originates in the Prussian Social Security Statutes of the 1880s. Their goal was mainly to prevent threats to the social order, stemming from the growing resentment of workers in the face of increasing insecurity in the course of industrialization. With benefit entitlements depending upon previous contributions, the insurance tradition was based on personal responsibility along with the principle of solidarity implicit in risk pooling. The social insurance tradition has radically changed the attitude towards social security.[8] With social insurance, stigma was removed from the recipient of social security benefits, rendering them respectability by making benefits an earned right. However, as benefit entitlements were conditional on past work, the social insurance tradition was mainly designed to keep regular full-time employees out of poverty, leaving those outside the regular workforce without protection.

The *welfare state tradition* is rooted in the humanistic conviction that there is a common responsibility of the society as a whole for the well-being of all citizens.[9] Deviating from libertarian principles, the common good is given priority over individual freedom. The welfare state tradition seeks to guarantee a socially acceptable lifestyle with minimal insecurity for every citizen by establishing national standards of social rights. Its goal is to promote social integration and progress towards an equal and more secure society, guaranteeing social security benefits if specific demographic or health related criteria are met. With universal social allowances it has produced the only new instrument of social security in the 20th century. Acknowledging the goal to improve society by state intervention, it created the notion that social security expenditure is a desirable form of public expense.

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8 Cf. Dixon 1999: 55 ff.
9 Cf. Dixon 1999: 61 ff.

Originating from the social security traditions described above, three ideal-typical strategies have evolved in Europe that may be referred to as the social assistance strategy, the social insurance strategy and the social allowance strategy.[10] The *social assistance strategy* is heavily rooted in the poor law tradition. Funding is typically provided by the state. The redistributive goal may be described as "poverty mitigation", i.e. the provision of a socially acceptable minimum support for those with inadequate income for reasons of misfortune. Vertical redistribution is not an original goal, although it may be an outcome. Social assistance is targeted on individuals meeting certain criteria of neediness, the objective being to keep social security expenditures low. As a consequence, means tests play a prominent role.

Economists have frequently advocated means tests for efficiency reasons,[11] arguing that rising social security budgets are inevitably associated with increasing allocative losses caused by the distortive nature of taxes and contributions. It is pointed out that in the presence of limited funds an extension of benefit entitlements to a greater part of the population is bound to leave less benefits available for the poor.[12] On the other hand, social scientists as well as economists have argued against means tests on the grounds that means testing reduces incentives for self-protection, as most of a person's savings have to be spent before he or she is eligible for benefits. Likewise, means tested benefits

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[10] Cf. Esping-Anderson 1990: 21 ff., Hill 1996: 75, Dixon 1999: 4 ff. Additionally, a fourth strategy may be identified which is currently less important in Europe but may gain influence in the future. Based on liberalism, the *marketization /privatization strategy* relies on market efficiency and emphasizes work and saving disincentives of social security benefits, drawing support from neoclassical economic theory. It proposes that social security measures that give rise to dependency and/or poverty traps are socially and politically unacceptable and that individuals in their self-interest should make provisions for themselves and not depend on government protection. Emphasis is shifted from community solidarity to individual responsibility with the objective to minimize economic distortions and moral hazards and to reduce public outlays. The instruments adopted include substitutionary and complementary voluntary contracting-out in favour of private providers as well as mandatory public, occupational or personal pension and savings plans involving no or minor risk pooling. The redistributive objective is income redistribution over the individual lifecycle. No horizontal or vertical redistribution is intended. While liberal economists advocate the marketization/ privatization strategy for efficiency reasons, social scientists criticize the strategy's shift from social to economic goals and its down-playing of equity considerations. Moreover, they warn against the danger that a new underclass of uninsurables will emerge comprising the most vulnerable who have low incomes but are obliged to pay the highest contributions.

[11] Cf. e.g. Culyer 1980: 185 ff.

[12] See, e.g., Tullock 1997: 103 ff.

are likely to discourage labour supply, as taking on a job with wages shortly above the eligibility threshold implies a very high effective marginal tax rate when the withdrawal of benefits is taken into account.[13] Apart from these risks of the so-called savings- and poverty-traps, the efficiency of means tests is undermined by high costs of administration and surveillance.[14] Moreover, sociologists and political scientists have warned of a loss of support for social policy by the middle and higher income classes, as these are unlikely to benefit from social security measures granted conditionally on means tests.[15] Finally, it has been argued that means tested benefits tend to reinforce social division by creating a category of "less-respectable" benefits that are granted to people outside the regular labour market.[16]

The *social insurance strategy* originates in the Prussian social insurance tradition. It is contribution-funded and focuses on specific social groups. The social security goal is poverty prevention, the redistributive objective may be described as horizontal redistribution, e.g. from working to currently-non-working members, from the childless to families with children. Vertical redistribution is not originally intended, although it may be an outcome. Within the social insurance strategy two sub-strategies may be identified. With *Bismarck-type social insurance*, coverage is strictly limited to specific groups, particularly workers or even occupations. Benefit entitlement is dependent on and related to past contributions or earnings. By contrast, *Beveridge-type social insurance* aims at a more extensive coverage. Entitlement is dependent on past contributions but benefits are usually flat-rate, although they may be differentiated with respect to demographic criteria such as the number of children.

The social insurance strategy has shifted the concern of social security from poverty mitigation to poverty prevention. It has thus the merit of having overcome the problem of inadequate voluntary self-protection due to individual short-sightedness, adverse selection and imperfect information. Specifically, it has been argued that social insurance provides a form of social security the

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[13] Cf. Atkinson 1998: 137 f., Hill 1996: 85, Steuerle 1996: 167 ff.

[14] Cf. Hill 1996: 85 f.

[15] Cf. e.g. Atkinson 1998: 137 ff., Binstock 1996: 161, Burtless 1996: 175, De Donder /Hindriks 1998.

[16] Cf. e.g. Esping-Anderson 1990: 24. Some of the problems associated with means-tested benefits can be reduced by assessing eligibility via tax returns rather than means tests, as practized in the Australian system. Cf. Dixon 1999: 45, Hill 1996: 87.

market can hardly attain.[17] For one thing, public social insurance is not affected by financial market fluctuations, as it is primarily funded by wage-dependent contributions. Additionally, compared to an insurance provided by a private company, with public social insurance the risk of insolvency of the insurance agency is greatly reduced. Finally, by rendering social security benefits an earned right, the social insurance strategy has removed stigma from the recipients.

The major shortcoming of the strategy relates to its incomplete coverage. This is especially obvious for Bismarck-type insurance, which due to its focus on workers leaves all those outside the group of regular full-time employees without adequate protection. Specifically, this problem concerns the self-employed, part-time workers, those in irregular forms of employment and those outside the workforce. Accordingly, out of the necessity of assessing entitlements and benefit levels for those with discontinuous work records increasingly complicated schemes have evolved. For Beveridge-type insurance the problem of fragmented coverage also applies, albeit to a lesser extent. However, due to the flat-rate nature of benefits there is the danger that higher income classes will withdraw their political support for the strategy and take advantage of contracting-out opportunities wherever possible. Due to the increasing number of atypical forms of employment and the lack of protection for those whose earning power has never developed, the insurance strategy is increasingly found to be insufficient to deal with all problems of social security.

The *social allowance strategy* is based on the humanistic ideal of common responsibility and social rights for all citizens originating in the welfare state tradition. It is funded by the state and considers a guaranteed minimum income, a right of nation-state citizenship. In contrast to the social assistance strategy, social allowances are granted irrespective of neediness according to mainly demographic criteria, such as children and age.[18] Entitlement and level of benefits are not related to past earnings or contributions, as the strategy aims at universal coverage and vertical income redistribution is considered an original goal.

The social allowance strategy undoubtedly has the merits of universal coverage and absence of stigma and deterrence, which rendered it the aspired

[17] Cf. e.g. Hill 1996: 77 ff.

[18] The most universal social allowance would be the granting of a basic income or citizens income. Cf. Hill 1996: 77.

social security strategy for most of the late 20th century. However, universal social allowances are an expensive instrument that few countries can afford. Accordingly, in the face of limited budgets there is the danger that it may result in poor or even inadequate levels of benefits.[19] Moreover, it has been argued that the social allowance strategy carries the risk of increasing state control and growing welfare dependence, leading to persistent poverty and the emergence of a welfare-dependent underclass.[20]

3 A Classification of European Social Transfer Systems

Due to the merits and shortcomings of the three strategies discussed in the previous section, ideal-type strategies are unlikely to prevail in real-world social security systems. Rather, a mixture of social security strategies is likely to be found, with the significance of the various strategies differing from country to country. To examine how current EU social transfer systems differ with respect to their adopted social security strategy mixes, we attempt to classify the European systems into several groups according to the extent to which the various strategies are employed.

In socio-economic literature, several attempts have been made to classify welfare states, the most notable studies being Esping-Anderson (1990), Castles and Mitchell (1992) and Korpi and Palme (1998). While most of these studies refer to the 18 OECD countries originally investigated by Esping-Anderson, to our knowledge no attempt has been made to classify the EU systems specifically. In addition, most of them do not focus exclusively on the social security strategies employed but also include political factors such as political orientation, the influence of labour unions etc. For the present purpose, however, it is desirable to concentrate exclusively on those characteristics of social transfer systems which are directly related to the social security strategies employed. Accordingly, in choosing input variables for classification, no account is taken of factors other than social security statistics and issues concerning social transfer legislations. Moreover, following Korpi and Palme

[19] Cf. Hill 1996: 76 f.
[20] Cf. Dixon 1999: 62.

(1998), attention is paid only to factors relating to the design of social security programs, whereas no issues depending on distributive outcomes are addressed.

From the characterization of social security strategies established in section 2 we infer that social security strategies may be distinguished according to funding, benefit levels and benefit entitlements. Accordingly, we introduce the following pairs of indicators that are designed to capture funding issues, the level of protection and the conditions for benefit entitlement respectively:[21]

1. With respect to funding issues the *share of T^{op} in GDP* and the *ratio of funding by state to funding by contributions* is reported;
2. With respect to the level of protection the *ratio of minimum income guaranteed to median equivalized income (MEI) for single adults* and an *indicator for income replacement rates of T^{op}* (excluding minimum income guaranteed) is invoked;
3. With respect to the conditions for benefit entitlement s*hare of means tested benefits in social expenditures* and an *indicator for the degree of coverage of T^{op}* are employed.

In establishing classifications of welfare systems, quantitative methods have rarely been employed.[22] This is due to the fact that statistical inference is impeded by the small number of observations that do not permit any sensible regression analyses. Instead, several heuristic and semi-quantitative investigations have been conducted. Nonetheless, with all purely qualitative assessments there is the danger of misjudging class assignments by overvaluing highly conspicuous features on the cost of neglecting the less obtrusive traits. A quantitative analysis of class assignments is therefore highly desirable. As has been noted by Kangas (1994), cluster analysis may be a sufficient method to determine class assignments in cases where regression analysis must be ruled out for lack of observations. Cluster analysis is a descriptive statistical instrument designed to identify a structure of "natural" groupings of cases on the basis of simultaneously comparing multiple characteristics.[23] For this purpose, in

[21] Details on the variables and indicators employed are given in Appendix A.

[22] The notable exception is Kangas 1994, who classifies 18 OECD countries with respect to their quality of health insurance, using traditional OLS regression, qualitative comparison analysis and cluster analysis.

[23] Cf. e.g. Johnson/Wichern 1998: 726.

a first step measures of distances for the values of input variables between cases are computed. Subsequently, grouping algorithms are employed to classify the cases into groups. Basically, hierarchically and partitioning algorithms may be distinguished. *Hierarchical clustering methods* proceed by a series of successive mergers, starting with individual objects and grouping them according to their similarities.[24] *Partitioning clustering methods* start from an initial partition of cases into groups and subsequently reassign the cases on the basis of their distance to cluster means.

In cluster analysis, sources of error and variation are not formally considered. To check for the stability of our results, several methods of hierarchical and partitioning cluster analyses are carried out. As to hierarchical cluster analysis, we conduct average linkage with quadratic Euclidean, Euclidean and city block distance as well as Ward linkage with quadratic Euclidean distance.[25] Additionally, the partitioning k-means clustering is run to identify four, five and six clusters respectively. As in cluster analysis different scales of measurement may greatly affect the results, all variables are normalized to the range of [0;1].[26] The analyses are conducted for the EU15 countries, with the exception of Luxembourg who has been excluded due to inadequate data.[27] As for Finland and Sweden comparable data on MEI are not available, the relation of minimum income guaranteed to MEI for these countries cannot be computed. To account for this inadequacy, we first carry out cluster analyses with all six input variables for the remaining twelve EU countries. Subsequently, the cluster analyses are run for all fourteen countries with only five input variables, excluding the relation of minimum income guaranteed to MEI. The second set of calculations is conducted to achieve a preliminary indication of the likely class assignment of Finland and Sweden. However, these results have to interpreted cautiously especially with regard to

[24] Strictly speaking, this only applies for the so-called agglomerative hierarchical clustering methods. The less common divisive methods proceed by starting from a single group and successively assigning the cases to subgroups according to their dissimilarity.

[25] As the Ward linkage method is associated with quadratic Euclidean distance by construction, association with other measures of distance has no sound theoretical basis.

[26] As the Ward algorithm is based on the presence of differences in variances, which are cancelled out by the more common z-transformation, the [0,1]-transformation is preferred.

[27] Specifically, in the case of Luxembourg data given in EUROSTAT 1999c do not allow expenditures to be differentiated according to benefits granted monetary or in kind; also, no data on the amount of means tested benefits are available.

the assignment of the southern European countries, as the absence of a universal scheme of minimum income guarantees is a distinguishing feature of this group.

The results of the cluster analyses can be graphically displayed by so-called dendrograms.[28] 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 measure at which cases are grouped together: Mergers close to the left-hand side of the 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.

As to the analyses with six input variables and twelve countries, the results of the hierarchical clustering methods are summarized by the dendrogram plots in Figure 1a to 1d:

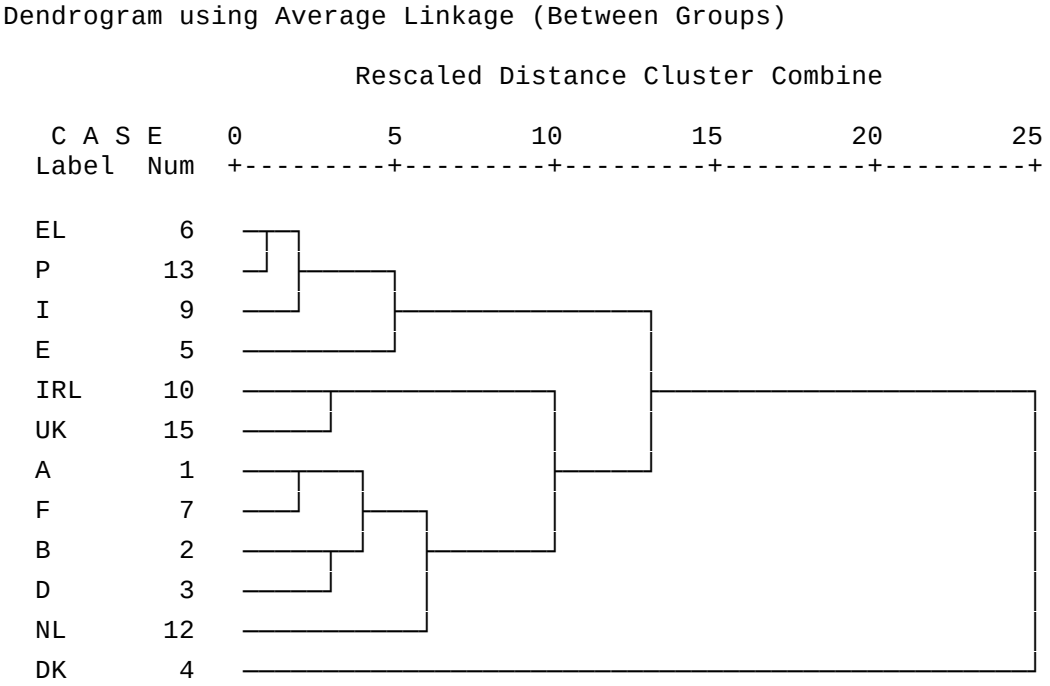

Figure 1a: Dendrogram; average linkage, quadratic Euclidean distance

[28] Cf. Johnson/Wichern 1998: 740 ff.

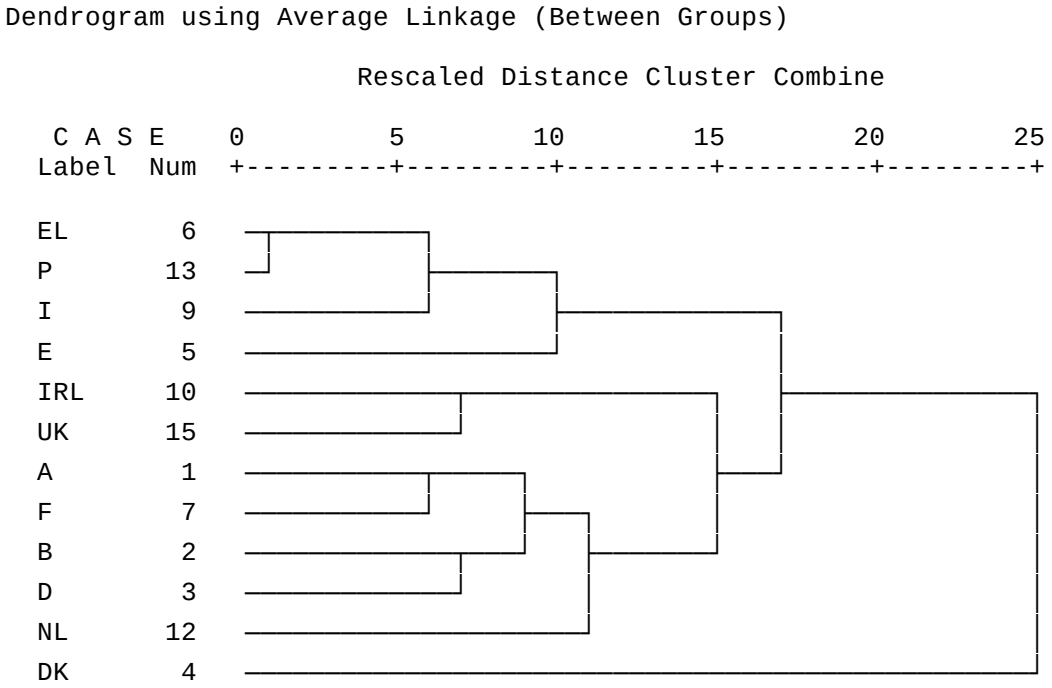

Figure 1b: Dendrogram; average linkage, Euclidean distance

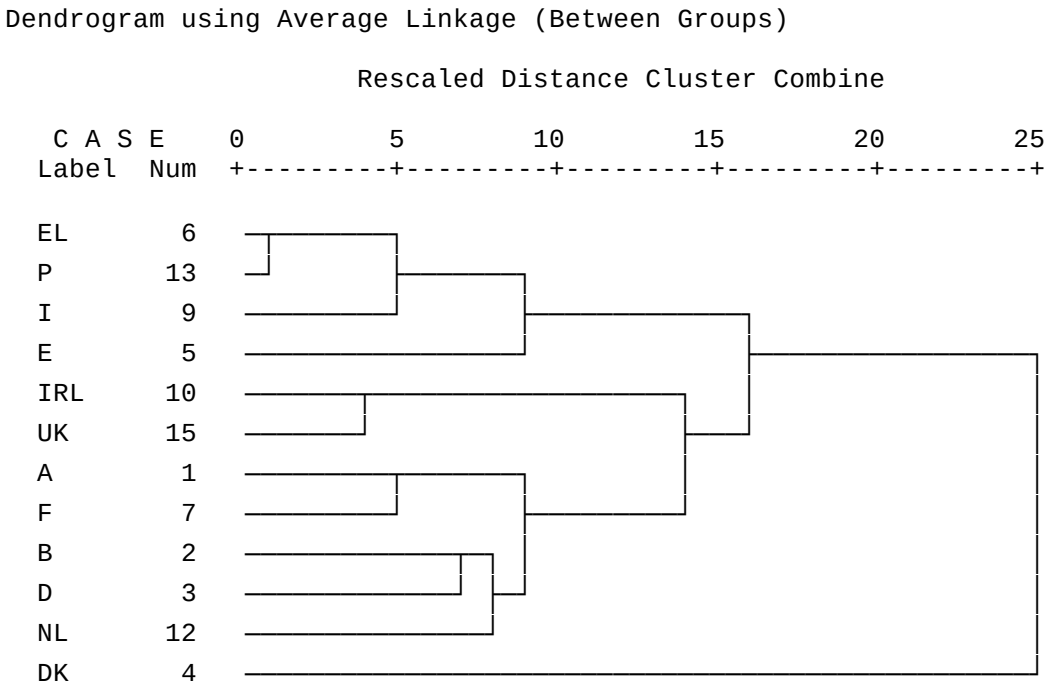

Figure 1c: Dendrogram; average linkage, city block distance

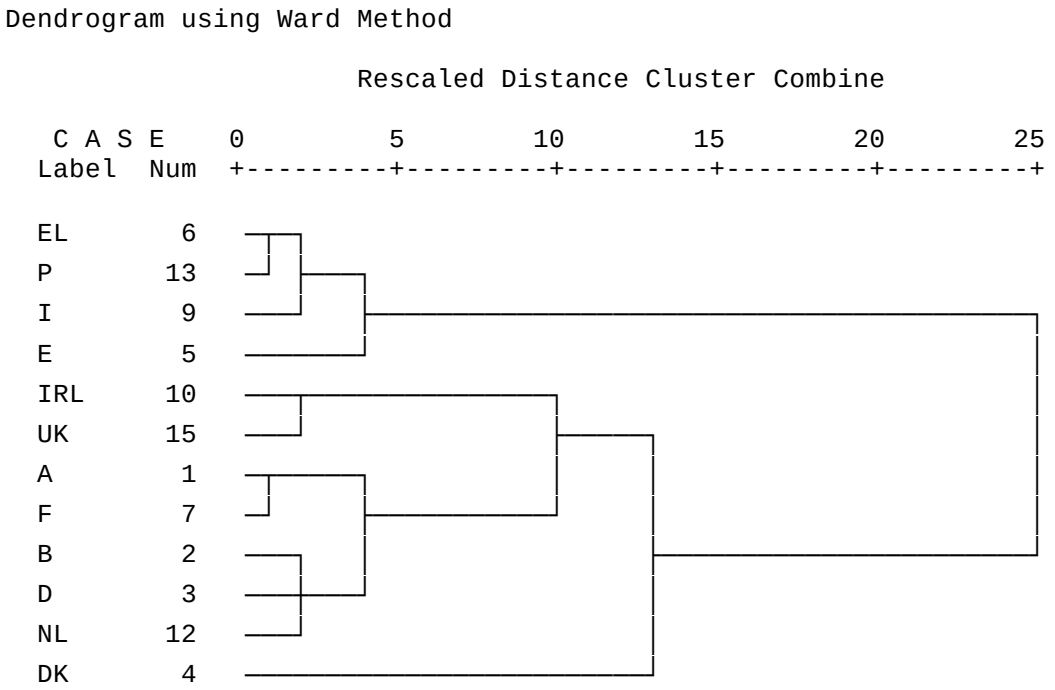

Figure 1d: Dendrogram; Ward linkage, quadratic Euclidean distance

The dendrograms shown in figures 1a to 1d show that with all methods employed, four broad classes of systems may be identified which are separated at a distance level between 5 and 10 (in 1a and 1d) and between 10 and 15 (in 1b and 1c) respectively.[29] The four southern European countries Greece, Portugal, Italy and Spain are grouped together, with Spain joining the cluster last, indicating a possible borderline position of this country. Ireland and the UK are clearly classified together into a second cluster. A third cluster comprises Austria, France, Belgium, Germany and the Netherlands. Within this group, Austria and France are separated from Belgium and Germany with all methods employed. Additionally the Netherlands is distinguished from the rest of these countries in all calculations based on average linkage clustering, also suggesting a possible borderline position. The fourth and last cluster is constituted by Denmark alone.

With k-means clustering, the supposed number of clusters has to be specified initially. The results obtained in the hierarchical clustering analyses suggest a

[29] The differences in distance levels at which the junctions occur are due to the different methods according to which aggregate distances are calculated. In 1a and 1d quadratic Euclidean distance is employed, which attributes more weight to large distances; as a consequence, mergers of very similar cases show up at a lower level of aggregate distance.

pre-determined number of four, five and six cluster as a sensible choice. The results are given in table 1 below:

	Cluster Assignments		
	4 Clusters	5 Clusters	6 Clusters
EL	1	1	1
P	1	1	1
I	1	1	1
F	1	1	3
E	1	2	2
A	2	3	3
D	2	3	3
B	2	3	4
NL	2	3	4
DK	3	4	5
UK	4	5	6
IRL	4	5	6

Table 1: k-means clustering, excluding FIN and SE

As the table shows, with four clusters pre-determined the grouping is almost identical to the results of the hierarchical clustering methods, with the exception of France who is now grouped together with the southern European countries. In the five cluster case Spain is set apart from the rest of the southern countries, lending further support to the borderline presumption mentioned above. With six clusters, France is reassigned to the group of Austria and Germany, whereas Belgium and the Netherlands are split from this cluster to form a separate group.

The results for the four-cluster-case roughly coincide with Esping-Anderson's (1990) and Kangas' (1994) classifications for the European countries, the most notable qualification being that in these studies of the southern European countries only Italy was included and assigned to the "corporatist cluster" along with Germany, Austria etc. Moreover, support is lent to Ferrera's (1996) reasoning, according to which the southern European countries follow a distinctive welfare regime that is characterized, amongst other things,[30] by institutional fragmentation, a polarization between generous

[30] Ferrera also mentions the comparatively high level of pensions for wage earners with a full career in the institutional labour market, the establishment of National Health Services, the presence of a peculiar public/private mix of institutions and actors and the persistence of particularism and clientilism. Cf. Ferrera 1996: 19ff.

protection within the regular labour market and macroscopic gaps in the non-institutional market and the absence of a national minimum income scheme. The arguments and data presented by Ferrera also support the possible border-line position of Spain and France suggested by the results of cluster analysis.

Turning to the analyses including Finland and Sweden but with input variables excluding minimum income guaranteed, figure 2a to 2d show the dendrograms resulting from the hierarchical clustering methods:

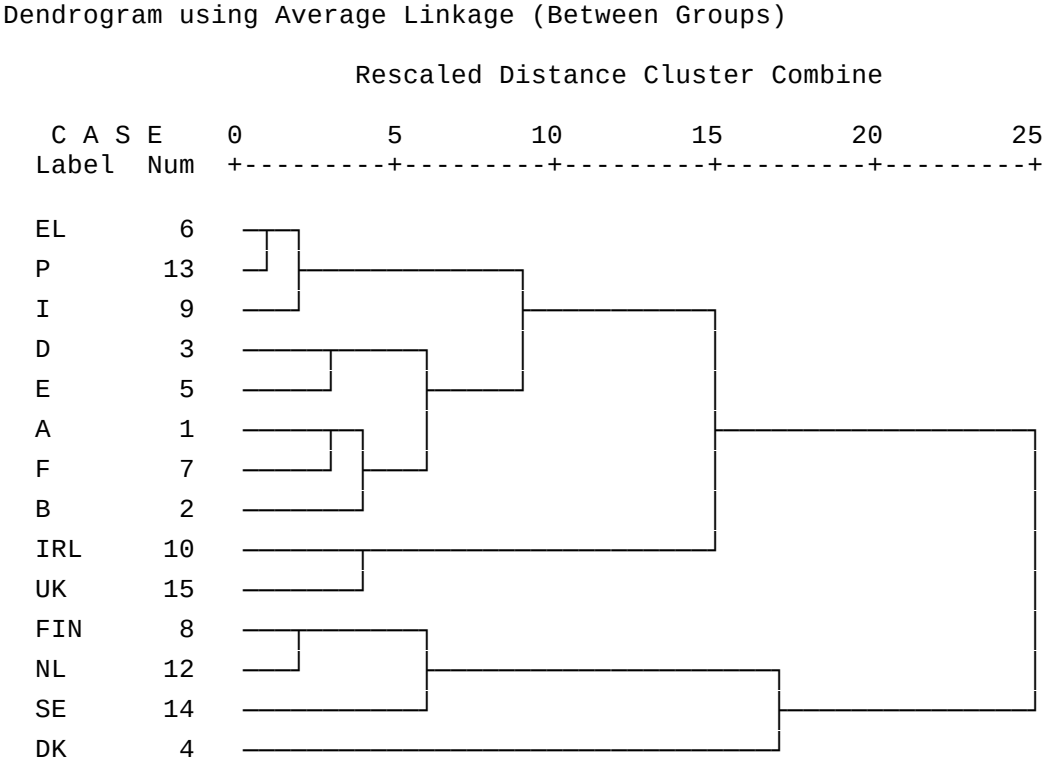

Figure 2a: Dendrogram; average linkage, quadratic Euclidean distance

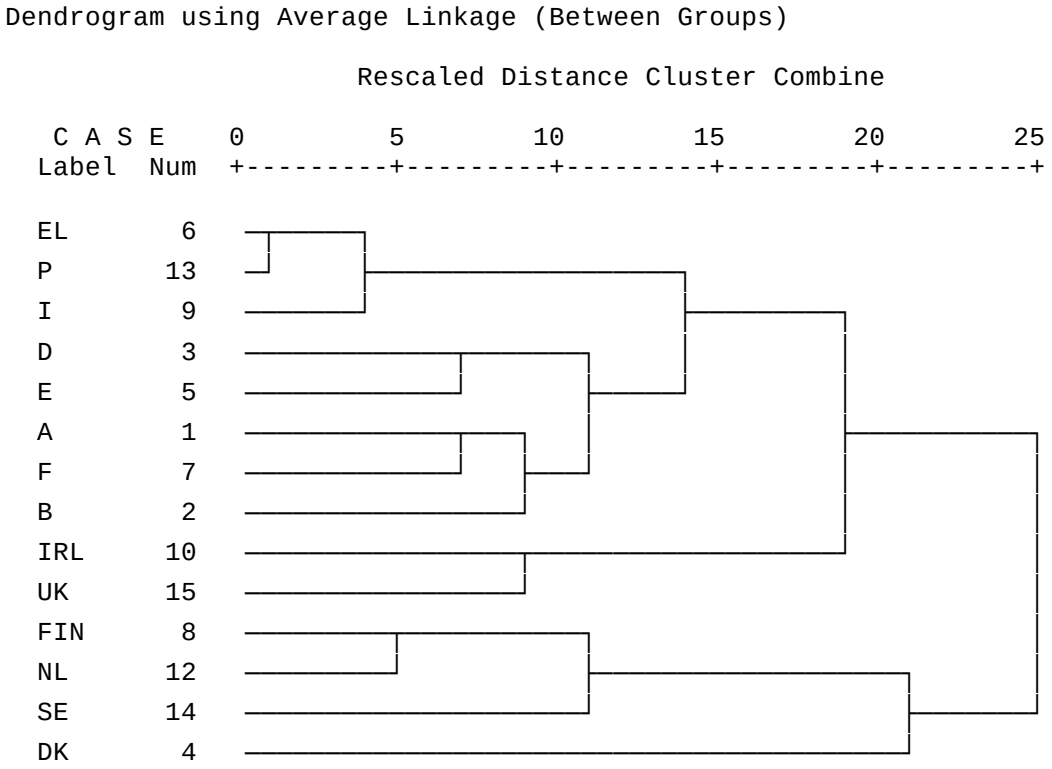

Figure 2b: Dendrogram; average linkage, Euclidean distance

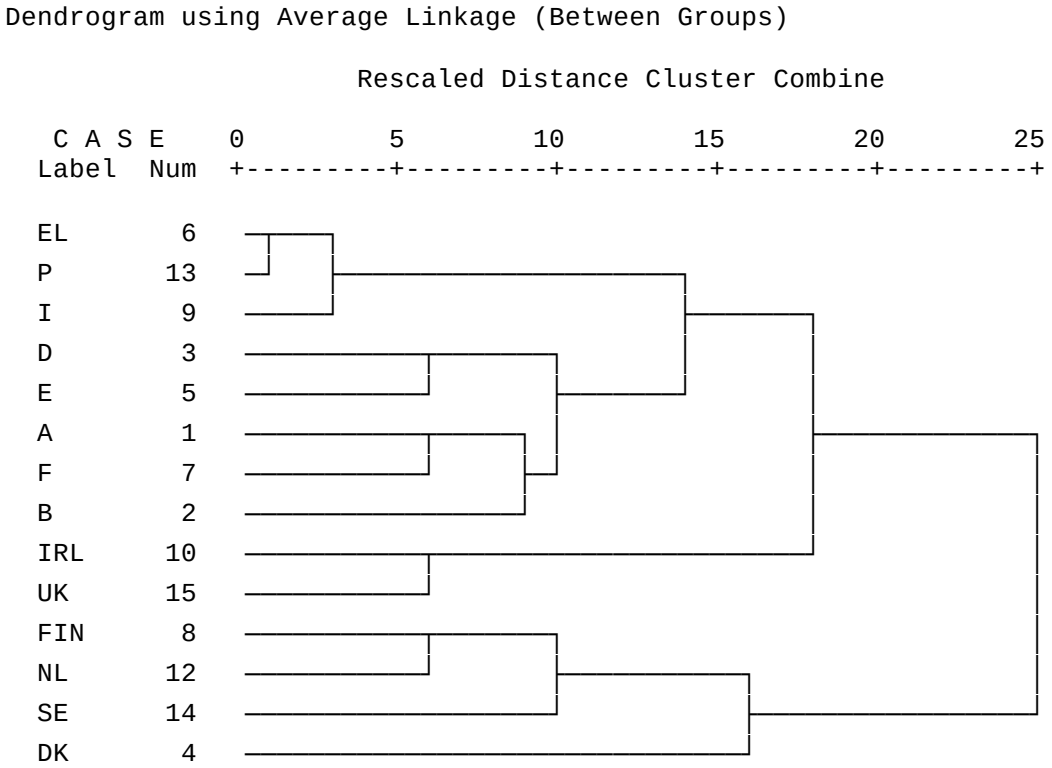

Figure 2c: Dendrogram; average linkage, city block distance

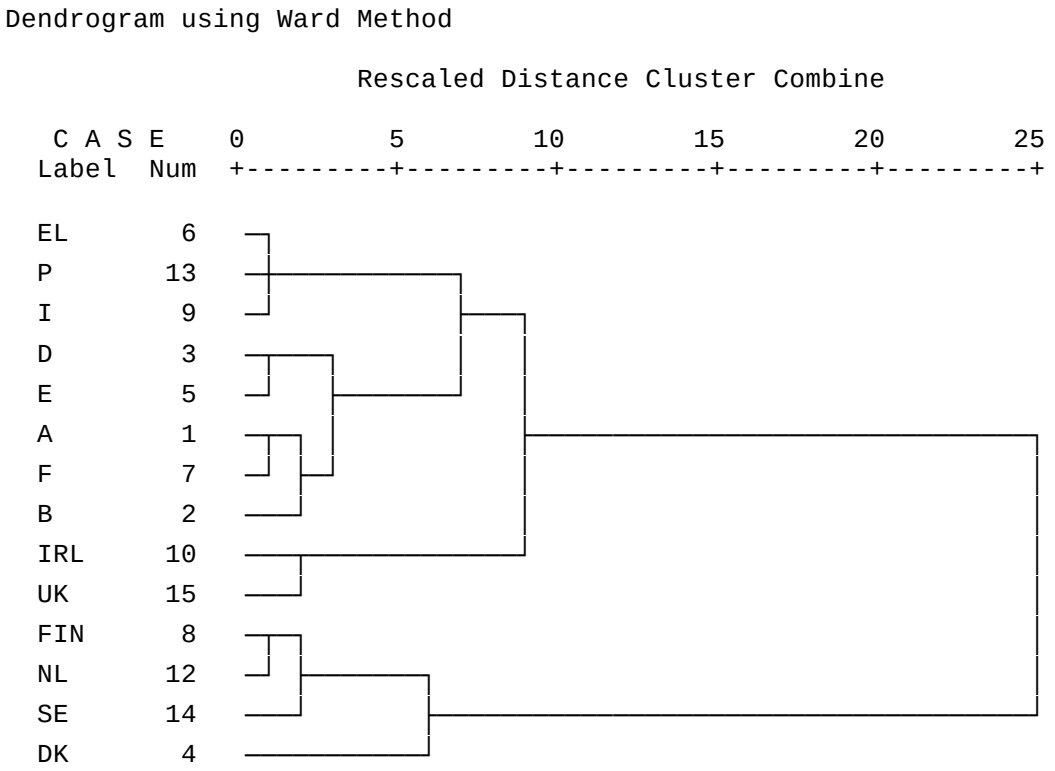

Figure 2d: Dendrogram; Ward linkage, quadratic Euclidean distance

As with the first set of calculations we identify four broad classes of social transfer systems. Again we find Ireland and the UK in a clearly distinguished cluster of their own. With all hierarchical methods Sweden and Finland are assigned to a second cluster together with Denmark, and are now joined by the Netherlands. The distances shown in the dendrograms suggest that Finland and the Netherlands resemble the rest of Europe more closely than Sweden and Denmark, the latter occupying a special position within the Northern in all calculations conducted. The third group is constituted by Germany, Austria and Belgium and is now joined by Spain and France, who in the first set of calculations were identified as borderline cases to the southern group. The latter is now constituted of Greece, Italy and Portugal. The shift of assignments for Spain and France is probably due to the disregard of the minimum income guarantee variable in the present set of calculations, as the absence of a minimum income guarantee is a characteristic that sets France and Spain apart from the other countries of the third group.[31]

[31] It should be noted that in Portugal a guaranteed minimum income has recently been introduced.

The results of k-means clustering for the case of 14 EU countries are given in Table 2 below:

	Cluster Assignments		
	4 Clusters	5 Clusters	6 Clusters
EL	1	1	1
P	1	1	1
I	1	1	1
F	1	1	1
E	1	2	2
A	2	2	1
D	2	2	2
B	2	2	2
NL	2	3	3
FIN	2	3	3
SE	2	3	4
DK	3	4	5
UK	4	5	6
IRL	4	5	6

Table 2: k-means clustering, including FIN and SE

The results for the analysis with four clusters predetermined largely agree with the corresponding analysis for the 12 country case, with Sweden and Finland being added to the group comprising Austria, Germany, Belgium and the Netherlands. With five clusters predetermined, Spain is again split from the rest of the southern countries, joining Austria, Germany and Belgium. Additionally, the Netherlands, Finland and Sweden are split off to form a separate group. Finally, with six clusters, Sweden is separated from the latter group.

Summarizing the results, we conclude that within the EU social transfer systems four general types of regimes may be identified. With regard to the strategy mix adopted, from the normalized values of the indicator variables for each country given in Appendix B, these regimes may described as follows. The *Southern European Cluster* is characterized by medium to low T^{op} expenditures that are mainly funded by contributions with additional financial support by the state. Earnings replacements are small, an unlimited guaranteed minimum income does not exist or varies according to local or regional regulations. Overall coverage is fragmented and means tests are of medium significance. The

dominant strategy adopted is Bismarck-type social insurance, which is kept at a low level and is only marginally supplemented by additional measures of social assistance or allowances. In the *Central European Cluster*, T^{op} expenditures are medium to high and are funded mainly by contributions, with minor support by the state. Both earnings replacement rates and guaranteed minimum income levels are medium to high. The degree of coverage is medium to low, the significance of means tests varies considerably among countries. The dominant strategy is Bismarck-type social insurance. It is supplemented by social assistance measures to provide a guaranteed minimum income for those not covered by the main strategy and a minor amount of social allowances, mostly in the field of family benefits. The *British Cluster* has medium to low T^{op} expenditures which are funded to more than 50% by the state. The level of guaranteed minimum income is among the most generous throughout the EU and is complemented by mainly flat-rate earnings replacements. The degree of coverage is medium to high, with means tests playing a prominent role. The dominant strategy is Beveridge-type social insurance coupled with social assistance, aiming at a high degree of coverage while keeping overall expenditures low through the widespread application of means tests. Finally, the *Northern European Cluster* is characterized by high T^{op} expenditures, which are funded to a large degree by the state. Both earnings replacements rates and the level of guaranteed minimum income are comparatively high. The degree of coverage is the highest in Europe, with means tests being of varying importance. The strategy adopted may be described as Beveridge-type social insurance supplemented to a comparatively large extent by non-contribution-based social allowances.

The cluster analyses show that most EU countries can be assigned to one of these groups fairly clearly.[32] With all clustering methods employed, Ireland and the UK unambiguously form the British cluster. Finland, Sweden and Denmark are almost unanimously assigned to the Northern cluster. Germany, Belgium and Austria constitute the core of the Central cluster, whereas Greece, Portugal and Italy are clear-cut members of the Southern cluster. In addition to these fairly unambiguous assignments, some borderline cases may be identified. For instance, France is assigned to the Central cluster with the hierarchical clustering

[32] A detailed table listing the cluster assignments obtained with all calculations is given in Appendix C.

methods but with k-means clustering she is classified into the Southern cluster. Conversely, in calculations where all input variables are employed Spain is a clear-cut member of the Southern group, while in the hierarchical calculations disregarding minimum income guaranteed she is assigned to the Central group.

A closer look at the details shows that within the Southern and the Central group two subgroups may be identified that differ in the level of protection and overall expenditure level. Accordingly, depending on the clustering method employed Spain and France are found in the less generous Central or the more generous Southern sub-cluster, pointing to a position on the verge of the Southern and the Central group. Similar considerations apply to the Netherlands, who with some methods is assigned to the Central cluster, whereas in other cases she is a member of the Northern group.

4 Redistributive Effects and Social Security Strategies

We now turn to the investigation of the linkage between the cluster assignment and the redistributive pattern produced by the various European systems. For this purpose we use data provided by a recent EUROSTAT investigation[33] on the redistributive effects of EU social transfer systems. The study reports the Gini coefficient, the quintile relation S80/S20, which gives the ratio of the income share of the 20% richest to the income share of the 20% poorest in total income, and the percentage of persons below the low income threshold of 60% MEI for primary equivalized income (PEI) and total equivalized income (TEI), respectively.[34] The results are based on data provided by the second (1995) wave of the European Community Household Panel (ECHP), including all EU15 countries with the exception of Finland and Sweden.

When discussing distributive impacts of social transfers, several aspects must be taken into account. Firstly, it has been well established that different measures of inequality assess a given income redistribution differently. For instance, as has been noted by Atkinson (1970) and Sen (1973), the Gini coefficient by its construction is most sensitive to changes in the lower-middle

[33] Cf. EUROSTAT 1999a.

[34] In EUROSTAT 1999a, primary equivalized income is defined as net income before T^{op}, whereas total equivalized income is defined as total disposable income including T^{op}.

ranges of income distributions.[35] By contrast, S80/S20 merely registers changes affecting the top and bottom quintile but does not react to changes in the medium range of the income distribution. Finally, the percentage of persons below 60% MEI only reports changes resulting in a change of the number of persons below and above the low income threshold but conveys nothing about the effects on the distribution within the low income group. Accordingly, to obtain a reasonable picture of redistributive effects, we investigate both the Gini coefficient and the relation S80/S20 and complement the results by an examination of the 60% MEI measure when appropriate. Secondly, as Castles and Mitchell (1992) have pointed out, when assessing the redistributive effects of social security systems, the initial, pre-transfer inequality must be taken into account. Especially when pre-transfer inequalities vary greatly, a mere comparison of post-transfer inequalities may yield a grossly misleading picture, as post-transfer inequalities tell nothing about the magnitude by which the initial inequality has been reduced. Consequently, the appropriate measure for assessing redistributive effects is the percentage reduction of the inequality measure employed. Thirdly, as the share of T^{op} expenditure varies considerably between the EU countries, the effectiveness of transfer systems should be judged in the light of the total amount of expenditure spent in social transfers.

Consequently, for a first look at redistributive effects we calculate the percentage reduction of initial inequality due to the addition of T^{op}, thus obtaining the *redistributive effects* for the three inequality measures considered. To account for differences in aggregate T^{op} spending, we subsequently divide the resulting figures by the share of T^{op} in GDP. We thus obtain three figures, capturing the percentage reduction of each inequality measure considered that is achieved by investing one percent of GDP in T^{op}. As these *relative redistribution effects* basically record outcome in relation to costs, they may also be interpreted as indicators of distributive efficiency.[36] The results on redistri-

[35] More specifically, the sensitivity of the Gini coefficient depends on the number of people in between the donor and the receiver of an income unit transfered. As the relative frequency of typical income distributions is highest in the lower middle ranges, the Gini coefficient attaches more weight to transfers affecting these income levels. Cf. Atkinson 1970: 255 f., Sen 1973, 32 f., Cowell 1995: 23. For further details on this subject we refer to Blackorby/Donaldson 1978.

[36] More specifically, the relative redistribution effect may interpreted as a measure of average efficiency. Of course, when interpreting the relative redistribution indexes the possibility must be considered that the reduction of inequality and poverty may be subject to increasing marginal costs.

bution effects and relative redistribution effects for the Gini coefficient, S80/S20 and the percentage of persons below 60% MEI are given in Appendix D. As the diagrams show, the relative redistribution effects vary greatly not only between systems but also between the different measures calculated for a given system. With regard to the Gini coefficient, the relative redistribution effect is the highest for France and Denmark, followed closely by the UK and Ireland and the rest of the Central cluster. By contrast, with S80/S20 the list is topped by Ireland and the UK, with France, Spain and the rest of the Central cluster following only with a considerable gap. The core countries of the Southern group (Greece, Italy and Portugal) are below average with all three measures. In general, the Central and the Northern Cluster are ranked higher when judged by the Gini than by S80/S20, whereas for the British cluster the reverse is true. The results for the 60% MEI measure are between those for the Gini and S80/S20.

Considering the different reaction of measures to changes in income distribution mentioned above, the results suggest that, apart from general differences in distributive efficiency, European social transfer systems also differ in the extent to which different income groups are favoured. Specifically, judging from the fact that the Central European cluster ranks best with regard to the Gini coefficient, we may hypothesize that social transfers in the Central cluster T^{op} principally affect the middle class. Conversely, the high records with S80/S20 for the British cluster suggests that in these countries T^{op} strongly favour the lower income groups.

To evaluate these hypotheses, we examine the redistributive effects of T^{op} for different income groups. To this end, we first compare the percentage of total T^{op} that is granted to the income quintiles in each country. As shown by the tables and diagrams in Appendix E, the share devoted to the lowest quintile is by far the highest in the British and Northern group (over 50%). Particularly notable is the high share of T^{op} granted to the top quintile by the Southern cluster countries Italy, Portugal and Greece (9 to 12%), whereas the British group in this respect with 4 to 6% is found at the bottom of the list. The Central cluster members Austria and Belgium and the borderline country France devote comparatively large shares to the medium quintiles.

Additionally, we examine the amount by which the average income of each quintile has increased after receiving transfers. For this purpose, we first calculate the relation TEI/PEI for each quintile, thus obtaining the percentage by which PEI has been increased after receiving T^{op}. Subsequently, in order to

attain comparability between countries, we normalize the figures by dividing them by the sum of percentages over the quintiles for each country. The resulting figures given in Appendix F indicate the amount by which the different income groups benefit from T^{op}, taking into account their income situation before transfers. As the figures show, changes for the lowest quintile are most favourable in the British cluster and least favourable in the Southern cluster. Conversely, the higher quintiles benefit most in the Southern cluster, whereas Ireland and the UK are found at the bottom of the list. In the Central cluster advantages are comparatively large for the medium quintiles. When plotting income changes over quintiles for each country, a remarkable result appears: As the diagrams and figures for variance, skewness and kurtosis given in Appendix F show, characteristic profiles emerge that reflect the cluster assignments identified in section 3. The redistributive patterns are seen to be strikingly similar for countries belonging to the same cluster but differ markedly between groups. In particular, with respect to the British cluster, the plot is heavily skewed to the left, whereas for the Southern cluster only slight skewness is observed. The Northern and Central cluster are found in between, with the Northern cluster exhibiting stronger skewness to the left.

The analysis of redistributive patterns suggests that for all countries having been clearly assigned in section 3, the class assignment according to strategies concurs with the grouping of distributive patterns according to skewness and kurtosis.[37] As to the borderline countries France and Spain, when judged by their distributive patterns they clearly belong to the group of the Central cluster, whereas the Netherlands should be assigned to the Northern group.

We conclude that the redistributive effects clearly reflect the cluster assignments of the EU social transfer systems. This points to the fact that the redistributive pattern of social transfers is heavily influenced by the adopted mixture of social security strategies. More specifically, the Beveridge-con-social-assistance strategy of the British cluster leads to a redistributive pattern that clearly reflects the simultaneous impact of both the poor law tradition and the Beveridge-goal of universal coverage. Consequently, the system is highly favourable to lower income groups, whereas recipients of medium and high incomes are markedly less favoured. By contrast, the Bismarck-con-social-

[37] A possible exception could be Belgium, who with regard to her redistributive pattern is on the verge to the Northern group.

assistance strategy of the Central cluster is primarily directed towards the protection of workers and places more emphasis on horizontal redistribution. Accordingly, medium income levels benefit to a comparatively large degree, while the low income groups are still covered by minimum income guarantees. As the latter are all but absent in the Southern cluster, the Bismarck strategy adopted produces only minor vertical redistribution. Finally, with regard to the Northern cluster, the Beveridge-con-social-allowance strategy produces a redistributive pattern half-way between the Central and the British cluster, being more favourable to low income groups than the Central cluster, whereas high income groups benefit stronger than in the British group.

5 Conclusion

In this paper, the linkage between social security strategies and redistributive effects in European social transfer systems has been examined. After identifying and discussing the three main social security strategies relevant for Europe, we have developed a classification for European social transfer systems on the basis of their adopted strategy mix. According to the results of the cluster analyses conducted European social transfer systems may be classified into four broad regimes which we referred to as the Southern cluster, the Central cluster, the British cluster and the Northern cluster. Apart from some border-line cases, the European countries may be assigned to these clusters fairly clearly.

Finally, the linkage between the class assignment of the social transfer systems and their redistributive pattern has been investigated. We have found that redistributive patterns are strikingly similar for countries belonging to the same cluster but differ markedly between groups. In particular, social transfer systems of the British cluster are highly favourable to the lower income groups. whereas the Central cluster are comparatively favourable to medium income levels.

We thus conclude that the redistributive effects of social transfer systems are heavily influenced by the adopted social security mix. Considering the high figures of redistributive efficiency for the British cluster and the prominent role of means tests in these countries, the results seem to support the preference of many economists for means-tested benefits. However, taking into account the risk of poverty and savings traps as well as the possible consequence of

increasing social division, this may prove a short-sided conclusion. With regards to an assessment of efficiency, a detailed investigation of social mobility and social exclusion in these countries seems highly desirably.

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Appendix A

The following indicators were used as input variables for the cluster analyses:

Funding issues:

(a) *Share of T^{op} in GDP*

This variable is introduced to capture the total effort invested in social transfers. T^{op} encompasses monetary social security benefits, excluding age and survivors pensions. Transfers in kind are not included in T^{op}. Figures are calculated on the basis of data given in EUROSTAT 1999c and refer to 1994.

(b) *Ratio of funding by state to funding by contributions*

This variable is employed to depict the significance of funding by contributions. It reports the amount of funding for total social security expenditures provided by the state in relation to the total amount of funding provided by direct contributions of covered persons and employers. Figures were calculated from data given in EUROSTAT 1999c and refer to 1994.

2. Level of protection:

(a) *Minimum income guaranteed in relation to median equivalized income for single adults*

This variable is designed to capture the minimum amount of protection an individual can expect, irrespective of his or her age, health conditions or marital status. Data on minimum income guaranteed for single adults are taken from Bundesministerium für Arbeit und Soziales (1996) and report total monthly benefits including additional allowances in 01/01/1995. Data on median equivalized income for single adults are given in EUROSTAT 1999b and refer to the reporting year 1994.

(b) *Indicator for income replacement rates of T^{op}*

This indicator is designed to depict the level of protection as designed in social security regulations. Using information from MISSOC (1995), income replacement is evaluated on the basis of regulations concerning benefits in case of sickness, invalidity, employment injuries and unemployment. Countries were classified into four categories and assigned the integer values 1 to 4, depending on whether regular

Appendix B

Values of indicator variables, normalized to [0,1]
Countries listed in descending order

	Share of Top in GDP
FIN	1.000
DK	0.800
NL	0.791
SE	0.767
B	0.601
UK	0.361
D	0.343
E	0.310
IRL	0.292
A	0.288
F	0.273
EL	0.045
P	0.038
I	0.000
L	no data av.

	Funding Ratio State to Direct Contributions
DK	1.000
IRL	0.406
UK	0.327
SE	0.241
FIN	0.179
L	0.158
P	0.138
EL	0.103
I	0.097
A	0.090
D	0.054
E	0.046
B	0.018
F	0.010
NL	0.000

	Share of Means Tested Benefits
IRL	1.000
UK	0.551
E	0.391
D	0.285
FIN	0.285
F	0.258
NL	0.216
I	0.203
SE	0.195
P	0.168
EL	0.157
A	0.110
DK	0.067
B	0.000
L	no data av.

	Indicator for Degree of Coverage
SE	1.000
FIN	0.929
DK	0.929
NL	0.857
L	0.786
A	0.714
UK	0.643
IRL	0.571
D	0.500
B	0.429
F	0.357
EL	0.214
P	0.143
E	0.143
I	0.000

	Ratio Minimum Income Guaran-teed to MEI
DK	1.000
IRL	0.926
UK	0.900
NL	0.745
B	0.712
D	0.683
L	0.644
F	0.481
A	0.423
I	0.327
P	0.000
EL	0.000
E	0.000
FIN	no data av.
SE	no data av.

	Indicator for Earnings Repl. Rate
SE	1.000
L	0.920
DK	0.770
D	0.770
E	0.620
NL	0.580
FIN	0.460
B	0.460
A	0.310
F	0.270
UK	0.230
IRL	0.230
I	0.230
P	0.120
EL	0.000

Source: Bundesministerium für Arbeit und Soziales 1996, EUROSTAT 1999b, 1999c, own calculations

benefits are income related and low (less than 50% for unemployment benefits or less than 70% for the remaining benefits), flat rate at about 50% or 70% of MEI respectively, income related and medium (50% to 75% or 70% to 80% respectively) or income related and high (more than 75% or more than 80% respectively). In calculating the overall indicator all categories were weighted equally.[1]

3. Conditions for benefit entitlement:

   (a) *Share of means tested benefits in social expenditures*

   This variable is designed to capture the amount of social security benefits granted on the basis of means tests. Data are taken from EUROSTAT 1999c and refer to 1994.

   (b) *Indicator for the degree of coverage*

   This indicator is invoked to capture the degree of overall coverage as designed by social security regulations. On the basis of information given in MISSOC (1995), coverage was evaluated taking into account entitlement conditions for benefits in case of sickness, employment injuries, invalidity, unemployment and for minimum income guaranteed. Regulations were assigned the integer values 1 to 4 in each category, depending on which groups of citizens are covered, the duration of waiting periods required for entitlement and the maximum period benefits are paid. Again, in calculating the overall indicator all categories were weighted equally.[2]

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[1] This weighting scheme has been chosen on the grounds that data available do not allow to differentiate T^{op} expenditures according to the above categories or according to the numbers of cases concerned. Moreover, weighing categories according to their share in total T^{op} expenditures or numbers of cases would imply risk neutrality, which seems a doubtful assumption, considering the very different future prospects to be expected in case the contingency occurs.

[2] The same considerations as with employment replacement rates apply.

Appendix C

Cluster assignments excluding Finland and Sweden, including minimum income guaranteed variable

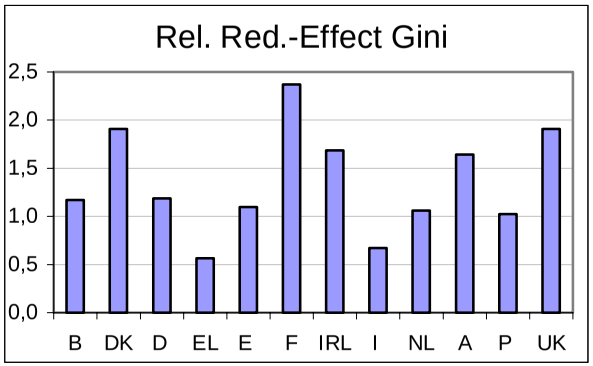
	Average Linkage Eucl. Distance			Average Linkage Quadr. Eucl. Distance			Average Linkage City Block Distance			Ward Linkage Quadr. Eucl. Distance			k-means Clustering		
	6 clusters	5 clusters	4 clusters	6 clusters	5 clusters	4 clusters	6 clusters	5 clusters	4 clusters	6 clusters	5 clusters	4 clusters	6 clusters	5 clusters	4 clusters
EL	south a	south	south	south a	south	south	south a	south	south	south a	south	south	south a	south a	south
P	south a	south	south	south a	south	south	south a	south	south	south a	south	south	south a	south a	south
I	south a	south	south	south a	south	south	south a	south	south	south a	south	south	south a	south a	south
E	south b	south	south	south b	south	south	south b	south	south	south b	south	south	south b	southb	south
F	center a	center a	center	center a	center a	center	center a	center a	center	center a	center a	center	center a	south a	south
A	center a	center a	center	center a	center a	center	center a	center a	center	center a	center a	center	center a	center	center
B	center a	center a	center	center a	center a	center	center b	center b	center	center b	center b	center	center b	center	center
D	center a	center a	center	center a	center a	center	center b	center b	center	center b	center b	center	center a	center	center
NL	center b	center b	center	center b	center b	center	center b	center b	center	center b	center b	center	center b	center	center
DK	north	north	north	north	north	north	north	north	north	north	north	north	north	north	north
IRL	british	british	british	british	british	british	british	british	british	british	british	british	british	british	british
UK	british	british	british	british	british	british	british	british	british	british	british	british	british	british	british

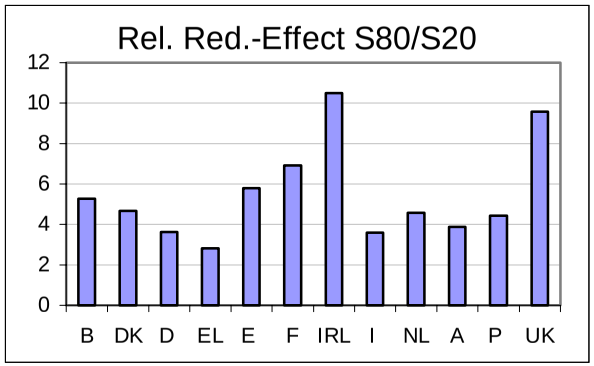
Cluster assignments including Finland and Sweden, excluding minimum income guaranteed variable

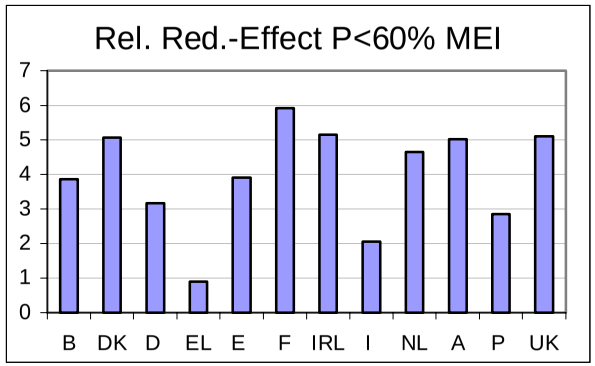
	Average Linkage Eucl. Distance			Average Linkage Quadr. Eucl. Distance			Average Linkage City Block Distance			Ward Linkage Quadr. Eucl. Distance			k-means Clustering		
	6 clusters	5 clusters	4 clusters	6 cluster	5 clusters	4 clusters	6 clusters	5 clusters	4 clusters	6 clusters	5 clusters	4 clusters	6 clusters	5 clusters	4 clusters
EL	south	south	center	south	south	center	south	south	center	south	south	south	south	south	south
P	south	south	center	south	south	center	south	south	center	south	south	south	south	south	south
I	south	south	center	south	south	center	south	south	center	south	south	south	south	south	south
E	center	center	center	center	center	center	center b	center	center	center b	center	center	center	center	south
F	center	center	center	center	center	center	center a	center	center	center a	center	center	south	south	south
A	center	center	center	center	center	center	center a	center	center	center a	center	center	south	center	center
B	center	center	center	center	center	center	center a	center	center	center a	center	center	center	center	center
D	center	center	center	center	center	center	center b	center	center	center b	center	center	center	center	center
NL	north a	north a	north a	north a	north a	north a	north a	north a	north a	north a	north a	north	north a	north a	center
FIN	north a	north a	north a	north a	north a	north a	north a	north a	north a	north a	north a	north	north a	north a	center
SE	north c	north a	north a	north c	north a	north a	north a	north a	north a	north a	north a	north	north c	north a	center
DK	north b	north b	north b	north b	north b	north b	north b	north b	north b	north b	north b	north	north b	north b	north
IRL	british	british	british	british	british	british	british	british	british	british	british	british	british	british	british
UK	british	british	british	british	british	british	british	british	british	british	british	british	british	british	british

Appendix D

	Share of T^{op} in GDP	Gini-Coefficient				S80/S20				Percentage < 60% MEI			
		PEI	TEI	Red.-Effect	Rel. Red.-Effect	PEI	TEI	Red.-Effect	Rel. Red.-Effect	PEI	TEI	Red.-Effect	Rel. Red.-Effect
B	10,35%	0,33	0,29	0,121	1,171	11	5	0,55	5,268	30	18	0,40	3,863
DK	12,24%	0,30	0,23	0,233	1,907	7	3	0,57	4,670	29	11	0,62	5,073
D	7,90%	0,32	0,29	0,094	1,187	7	5	0,29	3,618	24	18	0,25	3,166
EL	5,07%	0,35	0,34	0,029	0,564	7	6	0,14	2,819	22	21	0,05	0,897
E	7,59%	0,36	0,33	0,083	1,099	9	5	0,44	5,800	27	19	0,30	3,906
F	7,23%	0,35	0,29	0,171	2,370	8	4	0,50	6,912	28	16	0,43	5,924
IRL	7,41%	0,40	0,35	0,125	1,686	27	6	0,78	10,490	34	21	0,38	5,157
I	4,64%	0,32	0,31	0,031	0,673	6	5	0,17	3,589	21	19	0,10	2,051
NL	12,15%	0,31	0,27	0,129	1,062	9	4	0,56	4,572	23	10	0,57	4,652
A	7,38%	0,33	0,29	0,121	1,642	7	5	0,29	3,871	27	17	0,37	5,019
P	5,01%	0,39	0,37	0,051	1,024	9	7	0,22	4,438	28	24	0,14	2,853
UK	8,07%	0,39	0,33	0,154	1,907	22	5	0,77	9,577	34	20	0,41	5,103





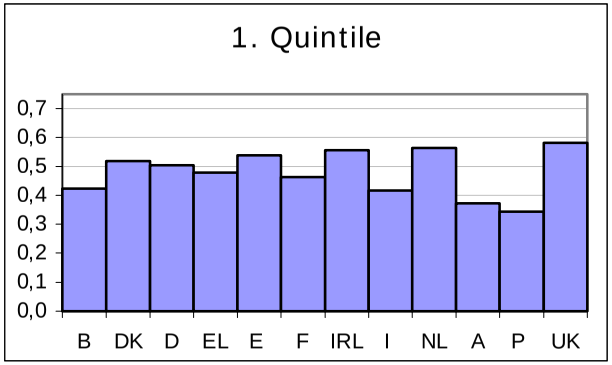


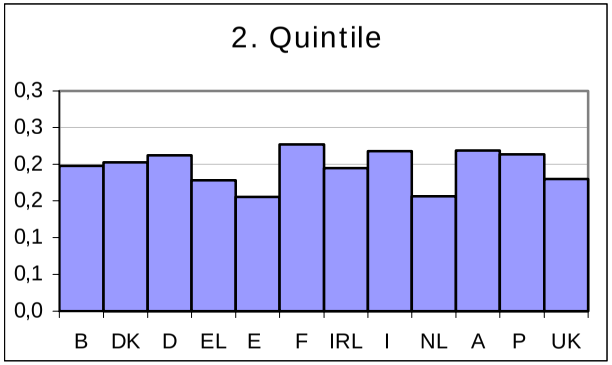
Source: Eurostat 1999a, Eurostat 1999c, own calculations

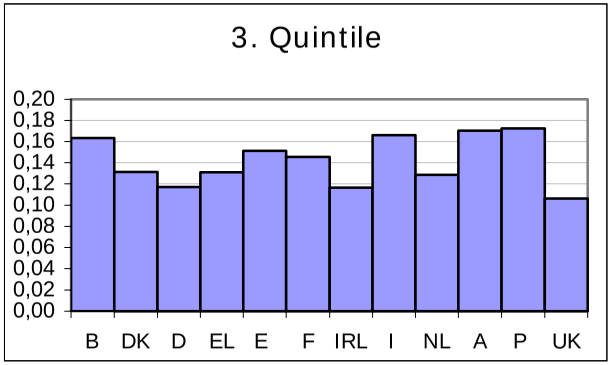
Appendix E

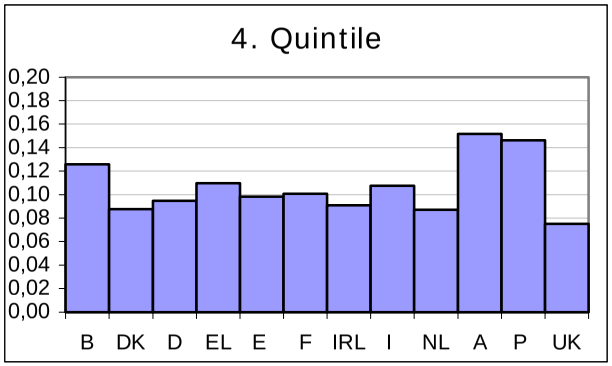
T^{op} according to PIE Quintiles
Percentage of Total T^{op} Expenditures

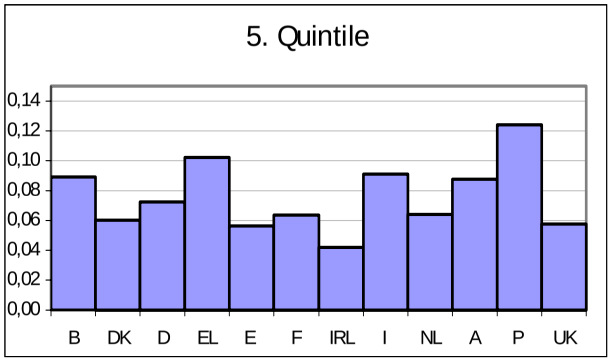
	1.Quintile	2.Quintile	3.Quintile	4.Quintile	5.Quintile	Sum
B	0,42	0,20	0,16	0,13	0,09	1,00
DK	0,52	0,20	0,13	0,09	0,06	1,00
D	0,50	0,21	0,12	0,09	0,07	1,00
EL	0,48	0,18	0,13	0,11	0,10	1,00
E	0,54	0,16	0,15	0,10	0,06	1,00
F	0,46	0,23	0,15	0,10	0,06	1,00
IRL	0,56	0,19	0,12	0,09	0,04	1,00
I	0,42	0,22	0,17	0,11	0,09	1,00
NL	0,56	0,16	0,13	0,09	0,06	1,00
A	0,37	0,22	0,17	0,15	0,09	1,00
P	0,34	0,21	0,17	0,15	0,12	1,00
UK	0,58	0,18	0,11	0,08	0,06	1,00











Source: Eurostat 1999a

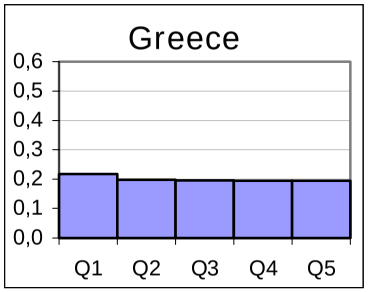
Appendix F

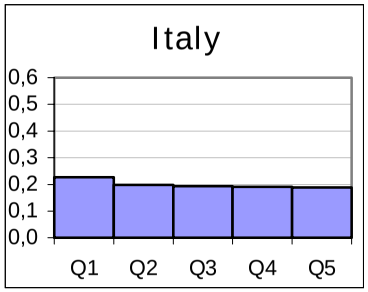
Primary and Total Equivalized Income in 1994

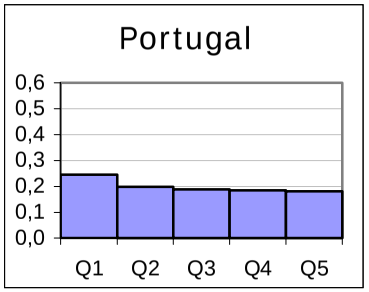
	Quintile 1		Quintile 2		Quintile 3		Quintile 4		Quintile 5	
	PEI	TEI	PEI	TEI	PEI	TEI	PEI	TEI	PEI	TEI
B	2276	6293	7554	9432	10876	12427	14601	15794	23910	24756
DK	2966	8839	7961	10260	11062	12550	14016	15012	22179	22862
D	3417	5916	8501	9553	11634	12215	15266	15737	25204	25563
EL	2517	2831	5048	5165	7019	7105	9628	9700	17099	17166
E	1907	3905	4910	5487	6967	7528	9804	10169	17649	17858
F	3216	6288	7398	8903	10559	11525	14463	15131	24750	25172
IRL	864	4585	4787	6089	8170	8950	12311	12919	23029	23310
I	3206	3856	6160	6500	8412	8671	11469	11637	18843	18985
NL	2350	6901	7357	8618	9734	10771	13147	13850	21946	22463
A	3587	6072	7889	9350	10981	12119	14559	15573	24543	25129
P	1838	2520	3958	4382	5919	6261	8239	8529	16443	16689
UK	1226	5959	6021	7488	10075	10940	14659	15271	26451	26919

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5		Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5				
	TEI: PEI	TEI: PEI	TEI: PEI	TEI: PEI	TEI: PEI	Total	TEI:PEI normalized	TEI:PEI normalized	TEI:PEI normalized	TEI:PEI normalized	TEI:PEI normalized	Total	Variance	Skew-ness	Kurtosis
B	2,76	1,25	1,14	1,08	1,04	7,27	0,38	0,17	0,16	0,15	0,14	1	0,0103	2,168	4,758
DK	2,98	1,29	1,13	1,07	1,03	7,51	0,40	0,17	0,15	0,14	0,14	1	0,0127	2,172	4,756
D	1,73	1,12	1,05	1,03	1,01	5,95	0,29	0,19	0,18	0,17	0,17	1	0,0026	2,093	4,463
EL	1,12	1,02	1,01	1,01	1,00	5,17	0,22	0,20	0,20	0,19	0,19	1	0,0001	1,361	2,000
E	2,05	1,12	1,08	1,04	1,01	6,29	0,33	0,18	0,17	0,16	0,16	1	0,0054	2,166	4,739
F	1,96	1,20	1,09	1,05	1,02	6,31	0,31	0,19	0,17	0,17	0,16	1	0,0039	2,073	4,377
IRL	5,31	1,27	1,10	1,05	1,01	9,74	0,55	0,13	0,11	0,11	0,10	1	0,0384	2,219	4,937
I	1,20	1,06	1,03	1,01	1,01	5,31	0,23	0,20	0,19	0,19	0,19	1	0,0003	1,925	3,667
NL	2,94	1,17	1,11	1,05	1,02	7,29	0,40	0,16	0,15	0,14	0,14	1	0,0128	2,206	4,891
A	1,69	1,19	1,10	1,07	1,02	6,08	0,28	0,20	0,18	0,18	0,17	1	0,0020	1,930	3,804
P	1,37	1,11	1,06	1,04	1,01	5,59	0,25	0,20	0,19	0,19	0,18	1	0,0008	1,881	3,773
UK	4,86	1,24	1,09	1,04	1,02	9,25	0,53	0,13	0,12	0,11	0,11	1	0,0341	2,225	4,959

Source: Eurostat 1999a, own calculations







TEI:PEI normalized,
Cases sorted according to skew-ness