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Equivalence scales reconsidered – an empirical investigation*

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Abstract

Households can differ in size and needs. A reliable assessment of inequality in living standards, therefore, necessitates the conversion of the original heterogeneous into an artificial quasi-homogeneous population. Ebert and Moyes (2003) and Shorrocks (2004) theoretically explore the properties of two conversion strategies, i.e., to calculate household equivalent incomes and then to weight household units by their size vs. their needs. We use data from the Luxembourg Income Study for examining the sensitivity of the Gini and the Theil index to the chosen conversion strategy, and explain our results by means of an inequality decomposition by household types. Country inequality rankings are sensitive to the conversion strategy applied. The decomposition analysis reveals the underlying mechanisms. We find inequality estimates typically to be lower in the size-weighted distribution compared to needs-weighting. This is driven by relatively higher weights of large household units in case of size weighting in combination with inequality being typically below average among households with children.

Keywords: income distribution, inequality, inequality decomposition, equivalence scale.
JEL classification: D31, D63, I32

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1 Introduction

Researchers and the public are eager to know about the distribution of living standards in a society. The living standard is determined by the material comfort goods and services available to each person provide. Household income or per capita income information, however, is a biased proxy for the level of material comfort when comparisons involve heterogeneous household types as multi-member household units can share and pool resources. The concept of equivalent incomes addresses this issue. Equivalent incomes are incomes that equalize the level of material comfort of persons living in different household types. Equivalent incomes are derived from household incomes using equivalence scales. Relative equivalence scales are deflators which make incomes of different household types comparable in terms of living standard. If a childless single adult serves as the reference household whose scale is set equal to one, relative equivalence scales measure the income needs of households relative to an *equivalent adult*. Alternatively, an *absolute* equivalence scale is the difference in the income of any household type and the equivalent income of a reference household type.

Based on household-level income data, the one-member-household equivalent income of a household unit can be assigned to each of its members and all individuals of an economy can be treated as if living in separate one-member households. Inequality indices, then, quantify inequality of living standards among artificial quasi-homogeneous individuals. Two types of inequality indices can be distinguished. Relative indices, indices which remain invariant under equi-proportionate income variations, and absolute indices, indices which are invariant to equal absolute changes in all incomes. In accordance with the predominant part of the empirical literature on inequality, the remainder of this article solely focuses on relative inequality indices and relative equivalence scales.

Although one might assess the assignment of the one-member-household equivalent income to each household member as most plausible or natural, such a conversion is not innocuous from a normative perspective. Ebert and Moyes (2003) study the implications of two normative conditions. According to *reference independence*, welfare or inequality comparisons should not be affected by a change of the reference household type, e.g. switching from a solitary adult to a couple. The application of reference-type-independence restricts admissible equivalence scales to be independent-of-base. Concerning relative equivalence scales, independence-of-base (IB) implies identical household-size economies across all levels of household material comfort. Relative equivalence scales of the IB type are standard in welfare and inequality analyses, and have been introduced independently by Lewbel (1989) and Blackorby and Donaldson (1993). According to the *between-type-transfer-principle*, an income transfer reducing the differences in living standards (equivalent incomes) between two households and not affecting the households' ranking by living standards, should always lead to a social improvement (cf. Ebert and Moyes, 2003, p. 331). Then, equivalent income can no longer be assigned to each household member. Instead, equivalent income must be assigned to a factor that is equal (proportional) to its equivalence scale. In case of relative equivalence scales, the outcome is a quasi-homogeneous distribution that depicts inequality of livings standards among *equivalent adults*. The key advantage of this type of conversion is that transfers leave the total equivalent income in the distribution of equivalent adults unaltered. On the contrary, in the distribution of one-member-households equivalent incomes, transfers between different household types change total equivalent income.

In this article, we contrast relative inequality estimates derived from both types of quasi homogeneous distributions for the class of IB relative equivalence scales. Inequality is measured by means of the Theil and the Gini index, both being among the most popular inequality measures in applied research. Estimates are provided for an extensive set of countries, and for various levels of household-size economies. Theil and Gini indices turn out to be sensitive to the chosen conversion procedure, and differences in the estimates are sufficiently large to change country inequality rankings – including reasonable levels of household-size economies. An inequality decomposition by household types reveals that this is due to an empirical regularity: compared to smaller household units, equivalent incomes of larger units tend to be distributed more equally.

Here is a roadmap to our paper. In Section 2, we suggest a useful benchmark scenario for investigating why needs-weighted inequality estimates are higher, and introduce the key concepts underlying our empirical analysis. In Section 3, we briefly explain our database and present our empirical results. Section 4 concludes the paper.

2 Preliminary considerations

2.1 A useful benchmark

Taking the one-member household as the reference, a relative equivalence scale gives the percentage change in household income required to maintain the living standard of each household member as the number of household members is altered. If household-size economies are achieved, the percentage change in household income which holds the living standard of a household's members constant is less than the percentage increase in family size. In practice, the 'correct' levels of household size economies are still under discussion. We apply a parametric equivalence scale suggested in Buhmann et al. (1988) allowing for variation in household-size economies through a single parameter, the 'equivalence-scale elasticity.' The Buhmann et al. (1988) relative equivalence scale is $ES(n_h, \theta) = (n_h)^{\theta}$, where n_h denotes the number of household members in a type-h household. Hence, household-size economies are represented by the catch-all parameter θ, with $0 \leq \theta \leq 1$, and no distinction is made between the financial needs of adults and children. However, in the decomposition analysis that follows, household types are defined both by the number of adults and children. Distinguishing between adults and children is useful as it reveals the mechanism that drives the differences in needs versus size-weighted inequality estimates. Varying θ is useful for investigating the robustness of our results.

Let κ denote a single household observation of size n_{κ}, and let x_{κ} denote household income. Then $y_{\kappa} = x_{\kappa} / (n_{\kappa})^{\theta}$ gives the one-member household equivalent income of κ. A distribution of artificial one-member-household equivalent incomes, a size-weighted equivalent income distribution ("S-weighted distribution"), is derived from the original heterogeneous household-income distribution by calculating, for each household unit, its one-member household equivalent income and weighting each household observation by the number of its members. Hence, if household monthly income is US\$2,000, the number of family members is four and the equivalence-scale elasticity is 0.5, the resulting equivalent income is $\text{US\$}2,000 / 4^{\theta} = \text{US\$}1,000$ and the household is weighted by four.

As demonstrated by Ebert and Moyes (2003), S-weighting is incompatible with the *between-type-transfer-principle*. The *between-type-transfer-principle* imposes that an income transfer, which reduces the difference in equivalent incomes of persons living in two different household units, must not increase inequality. The (non)-compatibility of the *between-type-transfer-principle* and principles such as utilitarianism, maximin or leximin is discussed in Ebert and Moyes (2003, pp. 331f.). A basic objection one can raise against the *between-type-transfer-principle* is that it ignores the number household members affected by the transfer. Accepting the *between-type-transfer-principle*, however, means that 'size weighting' is inappropriate. Instead, for relative inequality comparisons the equivalent income of a household unit must be calculated and households be weighted by a factor equal or proportional to the households' equivalence scales, which again must be of type IB and relative. To facilitate the economic interpretation, we weight each household by the household's relative equivalence scale (by its "needs"). The outcome is a needs-weighted equivalent income distribution ("N-weighted distribution"). Considering the previous example, this means that the equivalent income of US$1,000 is weighted by 2.0.

Concerning the level of household size economies, two extreme cases can be considered. In the first case, let the within-household production technology be such that full household-size economies are achieved ($\theta = 0$). Then, for all household types, household income equals equivalent income as $ES(n_h, \theta = 0) = 1 \quad \forall h = 1,...,H$, so that '$n$ household members live as cheap as one.' Weighting household income by the number of household members gives the S-weighted distribution. N-weighting, on the opposite, requires household units to be weighted according to the number of equivalent adults (equivalence scales). For $\theta = 0$, the number of equivalent adults is the same for all household size, namely 1.0, and the N-weighted distribution and the original distribution of household incomes coincide. In the second special case, let the within-household production technology be such that no household-size economies can be achieved ($\theta = 1$). Then, equivalence scales and the number of household members are always the same, $ES(n_h, \theta = 1) = n_h \quad \forall h = 1,...,H$, and the S-weighted and the N-weighted distribution coincide. Hence, this scenario can serve as a benchmark for studying the differences in inequality estimates derived from S- and N-weighted distributions.

2.2 Implications for inequality

Let us consider a heterogeneous population, where K_h denotes the number of household observations pertaining household type h. Then, $\sum_{h=1}^{H} n_h K_h$ is the total number of artificial one-member households, and $\sum_{h=1}^{H} ES(n_h, \theta) K_h$ is the total number of artificial equivalent adults. Accordingly, focusing on household unit κ of size n_κ, $p_\kappa^S = n_\kappa \Big/ \sum_{h=1}^{H} n_h K_h$ is the population share of all artificial one-member households constructed from household unit κ, or the *population share of* κ *in the S-weighted distribution*. The *equivalent-income share of* κ *in the S-weighted distribution* equals $\pi_\kappa^S = y_\kappa n_\kappa \Big/ \sum_{h=1}^{H} \mu_h n_h K_h$, where μ_h is mean equivalent income of type-h households. Overall mean equivalent income in the S-weighted distribution is $\mu^S = \sum_{h=1}^{H} \mu_h p_h^S$. Compared to this, the *population share of* κ *in the N-weighted distribution* equals $p_\kappa^N = ES_\kappa \Big/ \sum_{h=1}^{H} ES_h K_h$, $\pi_\kappa^N = y_\kappa ES_\kappa \Big/ \sum_{h=1}^{H} \mu_h ES_h K_h$ is the *equivalent-income share of* κ *in the N-weighted distribution*, and $\mu^N = \sum_{h=1}^{H} \mu_h p_h^N$.

These different characteristics of the S- and the N-weighted distribution have immediate implications for inequality estimates. For example, think of a heterogeneous population with many equally rich one-member households (in terms of equivalent income), and one poor multi-member household. Then the N-weighted distribution Lorenz dominates the S-weighted, and size-weighted relative inequality estimates would indicate more inequality than needs-weighted estimates. Yet, if the inequality measure is consistent with the *population principle*,[1] *within*-subgroup relative inequality, inequality among equal-type households, is immune to variations of θ and the weighting procedure: for each two equal-type households, ratios of population shares and of equivalent incomes always remain the same. Yet, what will typically change is inequality between household types. Decomposing inequality by household types, therefore, may be helpful to study how and why inequality in the N- and S-weighted distribution differs.

2.3 Decomposing inequality by subgroups

Decomposability of an inequality measure implies a coherent relationship between inequality in the whole population and inequality in its constituent mutually exclusive subgroups. The basic idea is to express overall inequality as a function of inequality within and between its subgroups. An index is additively decomposable if it can be written as a weighted sum of the within-subgroup inequality indices plus a between-subgroup inequality term based on mean equivalent incomes and subgroup sizes. Obviously, it is quite exceptionable that an inequality index possesses such properties, but the Theil coefficient is a pleasant example. Other measures including the Gini coefficient are not additively decomposable, and a residual term remains.

[1] According to the *population principle*, an inequality index should not be affected by an ρ-fold replication of the same distribution ($\rho > 0$).

Identifying subgroups of quasi-homogeneous households originating from households of equal type is the basic idea underlying our empirical analysis. This identification enables us to quantify how features of household-type specific income distributions affect inequality in living standards among artificial homogeneous units. Suppressing the N/S superscript, a decomposition of the Theil index, T, by population subgroups can be written as

$$(1) \qquad T = \underbrace{\sum_{h=1}^{H} T_h p_h \frac{\mu_h}{\mu}}_{W^T} + \underbrace{\sum_{h=1}^{H} p_h \frac{\mu_h}{\mu} \ln\left(\frac{\mu_h}{\mu}\right)}_{B^T},$$

where W^T is the within-subgroup component, B^T is the between-subgroup component, and

$$(2) \qquad T_h = \frac{1}{K_h} \sum_{\kappa=1}^{K_h} \frac{y_{\kappa,h}}{\mu_h} \ln\left(\frac{y_{\kappa,h}}{\mu_h}\right)$$

is the Theil index of the subgroup constructed from household type h.[2] The within-subgroup component of equation (1) is the sum of the subgroup specific Theil indices (equation (2)), whereby each T_h is weighted by the population share p_h times μ_h / μ. The latter expression captures how far mean equivalent income of type-h households deviates from overall mean equivalent income. Inequality between subgroups is measured by the second term on the right hand side of (1), and is determined by the weighted sum of relative deviations of subgroup specific from overall mean equivalent income.

Decomposing the Gini index, G, by population subgroups, gives,

$$(3) \qquad G = \underbrace{\sum_{h=1}^{H} G_h p_h \pi_h}_{W^G} + \underbrace{\sum_{h=1}^{H} \sum_{j>h}^{H} \left(\frac{\mu_j - \mu_h}{\mu_h}\right) \pi_h p_j}_{B^G} + O^G,$$

where G_h is the Gini index of the subgroup originating from type-h households,[3] π_h is the equivalent income share of h in total equivalent income ('economic weight'), and O^G is the 'overlap term.' Corresponding to the Theil decomposition, within-group inequality, as captured by the first term of equation (3), is represented by the weighted sum of subgroup specific Gini coefficients. Between-subgroup inequality is given by the sum of relative differences in mean equivalent incomes of any two subgroups, h and j, weighted by $\pi_h p_j$,

[2] See Cowell (1995), pp. 149-154, for details.
[3] See Pyatt (1976) for details.

whereby subgroups are ranked by mean equivalent income such that $\mu_j > \mu_h$. Abstracting from $\pi_h p_j$, the terms of the sum are the larger the bigger the relative differences in two subgroups' mean equivalent incomes are, viz. comparing 'rich' and 'poor' subgroups. Finally, the third term of (3) measures the overlap of subgroups' equivalent income distributions: ceteris paribus, the overlap is the higher the closer together the subgroup means of equivalent incomes are (see Lambert and Aranson, 1993, p. 1226).[4]

In (1-3), some elements are invariant to the way the quasi-homogeneous population is constructed from the underlying heterogeneous one, namely μ_hs, G_hs, and T_hs. Others, listed below, are sensitive to the type of conversion:

$$(4) \qquad p_h^S = \frac{n_h K_h}{\sum_{h=1}^{H} n_h K_h}, \; \pi_h^S = \frac{\mu_h n_h K_h}{\sum_{h=1}^{H} \mu_h n_h K_h}, \text{ and } \mu^S = \sum_{h=1}^{H} \mu_h p_h^S \,,$$

$$(5) \qquad p_h^N = \frac{ES_h K_h}{\sum_{h=1}^{H} ES_h K_h}, \; \pi_h^N = \frac{\mu_h ES_h K_h}{\sum_{h=1}^{H} \mu_h ES_h K_h}, \text{ and } \mu^N = \sum_{h=1}^{H} \mu_h p_h^N \,,$$

with:

- p_h^S: fraction of one-member households in the S-weighted distribution originating from type h households;
- p_h^N: fraction of equivalent adults in the N-weighted distribution originating from type h households;
- π_h^S: equivalent income share in the S-weighted distribution originating from type h households;
- π_h^N: equivalent income share in the N-weighted distribution originating from type h households;
- μ^S: mean equivalent income per capita in the S-weighted distribution;
- μ^N: mean equivalent income per equivalent adult in the N-weighted distribution.

3 Sensitivity analysis

3.1 Data

[4] For a more detailed discussion on the decomposability of the Gini and the properties of its different components see, for example, Lambert and Decoster (2005) and references cited therein.

Our empirical examination is based on data from the Luxembourg Income Study (LIS). For 30 countries and several years, the LIS provides representative micro-level information on private households' incomes and demographic characteristics (i.e., number, age and gender of each family member). To keep the empirical analysis tractable, only 20 countries (the US and 19 European countries) from a single LIS wave (1999/2000; see the Appendix Table A1 for details) are considered. Additionally, only data from nine household types are taken into account: one- and two-adult households with zero up to three children, and childless three-adult households.[5] As for some household types sample sizes are small, we also provide bootstrap estimates of the inequality coefficients' sampling variances.

Equivalent incomes are based on the LIS variable 'household disposable income' (*DPI*). *DPI* is harmonized across countries, covers labor earnings, property income, and government transfers in cash minus income and payroll taxes.[6] All *DPI*s reported are denoted in local currencies and prices. To meet the restrictions on the income domain imposed by Ebert and Moyes (2003) and Shorrocks (2004), only households with positive *DPI*s are considered. For each household type and country separately, Table 1a provides the number of observations (not weighted),[7] the fraction of the country-wide populations living in the same household type (weighted by household weights), and the average disposable household income per month (weighted by household weights). In addition, Table 1b summarizes some further aggregate features of the resulting country data bases, including the total number of observations (non-weighted), average household income, average household size and the fraction of the country population actually living in the nine household types. It turns out that the coverage is satisfactory well in all 20 countries we study, never falling below 60 percent.

[Table 1a about here]

[Table 1b about here]

3.2 Descriptive statistics of country-specific quasi-homogeneous distributions

This section summarizes several features of the country equivalent-income distributions, all of them constituting elements of Theil and Gini indices. Figure 1 depicts the ratio

[5] We use the LIS variables 'd4' and 'd27' to distinguish adults from children, where 'd27' gives the number of household members of age below 18 and 'd4' denotes the total number of household members.

[6] For the exact *DPI* definition see Luxembourg Income Study (2006), and for its cross-country comparability Burkhauser et al. (1996) and references therein.

[7] We provide the unweighted number of observations to give the reader a clear picture of the actual numbers of observations provided by LIS. Of course, all calculations are conducted to the base of weighted distributions.

p_h^S / p_h^N along the dimension of θ. The figure shows how much size- and needs weighted subgroup population shares differ. Estimates referring to the same country are connected by an interpolated line. Symbols and formats of lines (dashed vs. solid) distinguish estimates across countries. As the Buhman et al. (1988) equivalence scale makes no distinction between adults and children, only the number of household members matter. Hence, p_h^S / p_h^N estimates coincide for household types

- A1C1 and A2C0,
- A1C2, A2C1 and A3C0, and for
- A1C3 and A2C2,

where ‘A’ denotes ‘adult,’ ‘C’ denotes ‘child,’ and the adjacent figure gives the respective number of household members. Accordingly, the five graphs in Figure 1 convey all the empirical findings.

[Figure 1 about here]

For subgroups originating from households with at a minimum three members, p_h^S / p_h^N -curves are always downwards sloped. For two-member households (A1C1 and A2C0), there is no clear relationship between p_h^S / p_h^N and θ: In most countries, the relationship is positive, but u-shaped in others. For the one-member household, p_h^S / p_h^N -curves are upwards sloped. These patterns can be explained by country demographics. Household average size in a country is,

$$(6) \qquad \bar{n} = \frac{\sum_{h=1}^{H} n_h K_h}{\sum_{h=1}^{H} K_h},$$

and average equivalence scale is,

$$(7) \qquad \overline{ES} = \frac{\sum_{h=1}^{H} ES_h K_h}{\sum_{h=1}^{H} K_h}.$$

Accordingly,

$$(8) \qquad \frac{p_h^S}{p_h^N} = \frac{n_h}{ES_h} \cdot \frac{\sum_{h=1}^{H} ES_h K_h}{\sum_{h=1}^{H} n_h K_h} = \frac{n_h}{ES_h} \cdot \frac{\overline{ES}}{\overline{n}}$$

Whenever $\theta < 1$ and there is at least one multi-member household, the ratio $\overline{ES}/\overline{n}$ is smaller than 1.0. Moreover, for any multi-member household type, $\overline{ES}/\overline{n}$ is *increasing* in θ as $\partial ES_h/\partial\theta > 0$. As n_h/ES_h is equal to 1.0 in case of one-member households, the population share ratio of one member households, p_h^S/p_h^N with $n_h = 1$, is strictly monotonically increasing in θ. For multi-member households, a θ variation, per se, has an ambiguous effect on p_h^S/p_h^N as n_h/ES_h is *decreasing* in θ, thus mitigating the $\overline{ES}/\overline{n}$ effect. Empirically, it turns out that $\overline{ES}/\overline{n}$ is more sensitive to a θ variation than n_h/ES_h if $n_h >> \overline{n}$: For household types of size $n_h \geq 3$ (A1C2-A1C3, A2C1-A2C3 and A3C0), p_h^S/p_h^N is strictly *decreasing* in θ. In the case where $n_h \leq 2$ (subgroups A1C1 and A2C0), household size is less or almost equal to average size $\overline{n}$. If $n_h << \overline{n}$, p_h^S/p_h^N is strictly monotonically increasing in θ. For household types sized about the population average, $n_h \approx \overline{n}$, the p_h^S/p_h^N -curve is u-shaped: This applies especially to Norway ($\overline{n} = 1.99$) and Finland ($\overline{n} = 2.01$).

Observed p_h^S/p_h^N relationships have immediate implications for inequality, as can be seen from equations (1-3). Consider, for example, the between-subgroup component. Here we have that the weights assigned to differences in subgroup-specific mean equivalent incomes are contingent upon the type of conversion. But subtle differences even arise concerning the classification of 'rich' or 'poor' subgroups.' Following equation (1), one can call subgroup h

- 'rich' if $\mu_h/\mu^S > 1$; respectively if $\mu_h/\mu^N > 1$,
- 'poor' if $\mu_h/\mu^S < 1$; respectively if $\mu_h/\mu^N < 1$.

Figure 2 encompasses such ratios in nine separate graphs, containing six lines each. Solid lines are estimates of equivalent-income ratios derived from the S-weighted distribution; dashed lines from the N-weighted distribution. For each type of conversion, three lines are provided. The upper line gives the cross-country maximum of the equivalent income ratio, and the lower line the respective minimum. The line in between represents the cross-country mean. With the exception of the needs-weighted A2C0 subgroup, lines referring to subgroups originating from one- or two-member households are always upward sloping. Hence, these subgroups become 'richer' as θ goes up. For all other subgroups, downward sloping lines imply that they become relatively 'poorer' as economies of scale become less important. According to our definition of 'rich' and 'poor,' A1C0-A1C3 subgroups are notably poor. Across all countries, average equivalent income of the A1C1 subgroup (A1C3 subgroup) is about 28 percent (50 percent) below the average when $\theta = 0.6$ ($\theta = 0.55$) – irrespective of whether households are needs or size weighted.

[Figure 2 about here]

[Figure 3 about here]

Subgroups' population and equivalent income ratios again determine the overall mean equivalent income ratio: mean equivalent income per one-member household divided by mean equivalent income per equivalent adult. Figure 3 depicts this ratio, $\mu^S / \mu^N = \sum_{h=1}^{H} \mu_h p_h^S \Big/ \sum_{h=1}^{H} \mu_h p_h^N$, again as functions of θ. For all countries, the μ^S / μ^N -curve is downward-sloping for low values of θ, intersects the 1.0-threshold line from above at some medium level of θ, and then converges against the threshold line from below. This pattern is the aggregate outcome of the relationships presented in Figures 1 and 2.

Finally, Figure 4 gives the equivalent-income share ratios,

$$(9) \qquad \frac{\pi_h^S}{\pi_h^N} = \frac{n_h}{ES_h} \cdot \frac{\sum_{h=1}^{H} \mu_h ES_h K_h}{\sum_{h=1}^{H} \mu_h n_h K_h} = \frac{n_h}{ES_h} \cdot \frac{\mu^N}{\mu^S} \cdot \frac{\overline{ES}}{\bar{n}} = \frac{p_h^S}{p_h^N} \cdot \frac{\mu^N}{\mu^S},$$

plotted against θ. For all countries, the π_h^S / π_h^N -curves are positively sloped for subgroups A1C0, A1C1 and A2C0, and negatively sloped else. As can be seen from equation (9), this pattern is caused by the interaction of the relationships presented in Figures 1 and 3.

[Figure 4 about here]

3.3 Sensitivity of inequality estimates

3.3.1 Theil index

Figure 5 presents our main results for the Theil index. The upper left graph depicts the ratio T^S/T^N plotted against admissible values of θ. In a predominant number of countries, T^N exceeds T^S and the ratio T^S/T^N increases in θ. Only in Poland, Norway and Sweden and for high values of θ, $T^S/T^N > 1$. Relative differences between T^S and T^N can be substantial. For example, the index ratio is about 0.83 for $\theta = 0.10$ in Slovenia, Belgium and Ireland. Moreover, ratios differ substantially across countries. For example, $T^S/T^N = 1.02$ in Poland and 0.93 in Ireland for $\theta = 0.60$. As we will show in Section 3.4, these cross-country differences are sufficiently large to affect country inequality rankings.

To understand the relationship presented in the upper left graph of Figure 5, we also depict the ratios of size- and needs-weighted within- and between-subgroup component. The within-subgroup component ratio concerning the Theil index, $W^{T,S}/W^{T,N}$, as defined in equation (1) is depicted in the upper right graph. Like the T^S/T^N-ratio, the $W^{T,S}/W^{T,N}$-ratio increases in θ, and is usually smaller than 1.0. Compared to the N-weighted distribution, the population share of inequality-diminishing groups, therefore, must be higher in the S-weighted distribution. As size-weighting attaches larger weights to multi-member household units, equivalent-incomes of 'large' households should be distributed more equally. Indeed, subgroup-specific Theil indices – provided in Table 2 – give empirical support: Especially children tend to have an inequality-reducing effect. Only Poland, Norway and Sweden deviate from this empirical regularity. And, exactly in these three countries, the $W^{T,S}/W^{T,N}$-ratio is *non*-increasing in θ.

[Figure 5 about here]

[Table 2 about here]

Finally, turning to the between-group component of the Theil index, the lower left graph of Figure 5 gives the $B^{T,S}/B^{T,N}$ - ratio as defined in equation (1). For small values of θ, $B^{T,S}/B^{T,N}$ is substantially smaller than 1.0. For example, across all countries, $B^{T,S}/B^{T,N} \leq 0.74$ at $\theta = 0$. The $B^{T,S}/B^{T,N}$-ratio is s-shaped in θ, crossing the 1.0-threshold line for medium levels of θ (reaching a cross-country peak of ≈ 1.15 for $\theta = 0.55$ in Switzerland), and then again converging to $B^{T,S}/B^{T,N} = 1$ for $\theta \to 1.0$. This relationship is due to mutually enforcing and mitigating effects resulting from the patterns depicted in Figures 1-4.

3.3.2 Gini index

Analogously to the Theil-index ratios presented in Figure 5, Gini-index ratios are plotted in Figure 6. The graph top left gives the Gini-index ratio, G^S / G^N; up right depicts the between-subgroup ratio, $B^{G,S} / B^{G,N}$; down left the within-subgroup ratio, $W^{G,S} / W^{G,N}$; down right the overlap-component ratios, $O^{G,S} / O^{G,N}$, all defined in equation (3). Several parallelisms to the results concerning the Theil index occur. First, with the only exception being Poland, G^N, like T^N, signals more inequality than its S-weighted analogue, and this effect intensifies as θ decreases (see upper left graph of Figure 6). The ratios T^S / T^N and G^S / G^N are even similarly sized. Second, the within- and the between subgroup ratios of the Theil and the Gini index change in a likewise manner: the increase of the within-subgroup component ratio in θ (see graph bottom left) as well as the s-shape of the between-subgroup-component ratio (see graph up right) is reconfirmed.

The within- and the between-component ratios for the two indices, however, differ slightly. For most countries and values of θ, $W^{G,S} / W^{G,N} < W^{T,S} / W^{T,N}$ and $B^{G,S} / B^{G,N} < B^{T,S} / B^{T,N}$. This can be explained by the overlap-component ratio, $O^{G,S} / O^{G,N}$, capturing some of the variation. Overlaps are sensitive to the transformation procedure as equivalent-income distributions' overlaps of any two subgroups are weighted differently, by p_h^S vs. p_h^N.

[Figure 6 about here]

3.4 Inequality parades

Figure 7 illustrates the implications of size vs. needs weighting for cross-country comparisons of inequality. Two 'inequality parades' for each index are provided – one for the S- and one for the N-weighted distribution. Parades are obtained by sorting countries according to their index.[8] The country with equivalent incomes being most equally

[8] Such a ranking ignores the possibility that average equivalent-income levels differ across countries. So, a country – such as the US – is at the bottom of the ranking although average equivalent income in the US is among the highest.

distributed is assigned a ‘1,’ the country with the most unequal distribution a ‘20.’ The upper two graphs give country rankings by the Theil index, the graphs below by the Gini index. As demonstrated in previous literature (cf. for example Coulter et al. (1992), Burkhauser et al. (1996), Aaberge and Melby (1998), Duclos and Makdissi (2005)), rankings are sensitive to the chosen index and equivalence-scale elasticity. In addition, it turns out that the conversion method itself has an impact on the inequality parade.

[Figure 7 about here]

Let the sequence of ranks reported be $\left[T^S, T^N, G^S, G^N\right]$. Then, taking Germany as an example, the numbers are $\left[7,8,9,10\right]$ when $\theta = 0.4$, and $\left[6,7,9,10\right]$ when $\theta = 0.2$; $\left[10,10,8,8\right]$ and $\left[8,9,5,5\right]$ in case of Switzerland. Size- and needs-weighted rankings, by definition, coincide for $\theta = 1.0$, Yet, in case of the Theil (Gini) index, rankings already become different for $\theta \leq 0.95$ ($\theta < 0.85$). The sensitivity of inequality indices to the conversion method is illustrated in Table 3.

[Table 3 about here]

Here we provide the frequency and size of country re-rankings, and also Kendall's rank correlation coefficients of inequality rankings under S- and N-weighting. Consider, for example the entry in column labeled ‘1’ (‘-2’) and row $\theta = 0.25$ in case of the Theil index. Here we have a value of ‘3’ (‘1’). This entry means: three countries (one country) ascend (descend) one rank (two ranks) in the parade when switching from a conversion by size to needs.[9] Column ‘Sum’ gives the sum of the following product: number of ascends times frequency of occurrence. For example, consider the entry in row ‘$\theta = 0.20, G$.’ There we have the value $3 \cdot 2 + 3 \cdot 1 = 9$ as three countries ascend two and three ascend one rank. These descriptive findings illustrate that, indeed, inequality rankings are sensitive to conversion schemes. Kendall’s rank correlation coefficients give confirmative evidence. In case of the Theil index (Gini index), Kendall’s ranking correlation coefficient decreases in θ when θ is low, reaching a minimum of 91.58 (84.21) for $\theta = 0.1$, and then tends to increase in θ.

[9] Ascending (descending) means that the number assigned to a country in the ranking becomes smaller (bigger).

We want to conclude with a comparison of N- vs. S-weighted inequality estimates when $\theta = 0.5$. In this case, the Buhman et al. (1988) equivalence scale is equivalent to the "square root scale' which has been used extensively in the measurement of inequality. Table 4 summarizes our findings. Differences in inequality estimates are most pronounced for Belgium and Ireland. Here, S- and N-weighted Theil indices differ by about two percentage points; Gini indices by more than one percentage points. Although even these differences may appear small, they can change country inequality rankings. Indeed, for $\theta = 0.5$, Rendall's rank correlation coefficient for S- and N-weighted country ranking is 91.58 percent (90.53 percent) when the ranking criterion is the Theil (Gini) index.

[Table 4 about here]

4 Conclusion

For 20 countries, we have presented inequality estimates for a size and a needs weighted quasi-homogeneous equivalent-income distribution. The theoretical properties of both distributions have been explored in Ebert and Moyes (2003) and Shorrocks (2004). Our empirical examination reveals that country inequality rankings are conversion sensitive for equivalence scales implying reasonable or usually applied within-household size economies. By means of a decomposition analysis, we have investigated the mechanisms and identified the key source that make needs and size weighted inequality estimates diverge. That inequality estimates are typically lower in the size-weighted distribution is driven by two effects: Higher weights of large household units in case of size weighting in combination with low income inequality among households with children.

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Table 1a. Sample description by subgroups

Country code		A1C0	A1C1	A1C2	A1C3	A2C0	A2C1	A2C2	A2C3	A3C0
	Av. Income	18,487	20,097	23,553	21,427	33,947	37,827	39,098	40,678	46,562
AT	Number of obs.	577	45	24	2	671	157	221	61	201
	Pop. share	13.19	2.16	1.29	0.13	23.27	11.17	15.56	3.93	8.56
	Av. Income	48,384	56,229	68,968	68,910	105,543	120,479	129,142	145,594	135,953
BE	Number of obs.	603	35	25	7	636	174	265	96	96
	Pop. share	15.33	1.79	1.57	0.77	25.73	9.11	19.55	8.05	5.48
	Av. Income	2,527	3,599	3,559	3,011	5,088	6,912	7,789	7,577	6,857
EE	Number of obs.	1,102	166	69	21	1,650	610	523	139	600
	Pop. share	11.51	2.80	1.17	0.44	22.60	13.84	12.70	3.25	9.78
	Av. Income	6,456	8,905	10,280	11,970	13,709	16,379	18,293	19,124	18,527
FI	Number of obs.	2,047	157	89	26	3,523	1,032	1,219	531	782
	Pop. share	17.61	2.18	1.60	0.68	28.81	9.91	14.31	7.49	6.20
	Av. Income	8,198	9,150	9,825	11,237	14,581	16,807	18,322	19,660	19,803
FR	Number of obs.	2,640	219	125	35	3,278	879	1,086	417	659
	Pop. share	11.89	1.75	1.54	0.54	25.31	11.14	16.21	7.73	7.51
	Av. Income	2,653	2,553	2,489	3,050	5,097	5,667	6,315	6,252	6,560
DE	Number of obs.	3,016	220	104	21	3,573	1,029	1,082	304	688
	Pop. share	19.59	1.99	1.15	0.24	28.72	10.76	13.21	4.19	7.16
	Av. Income	205,401	274,788	280,460	931,000	313,643	525,043	546,649	462,313	504,929
GR	Number of obs.	676	16	14	1	1,071	295	447	71	490
	Pop. share	6.88	0.37	0.45	0.03	19.30	7.83	17.90	2.99	13.90
	Av. Income	41,048	45,528	73,045	46,183	75,090	107,245	106,213	100,825	99,466
HU	Number of obs.	409	22	7	2	556	154	176	40	220
	Pop. share	10.04	0.89	0.32	0.15	21.01	9.47	13.48	3.66	13.42
	Av. Income	947	835	945	872	1,693	2,278	2,428	2,826	2,401
IE	Number of obs.	480	37	25	8	565	156	242	163	175
	Pop. share	8.68	2.23	1.62	1.04	15.50	7.75	15.13	9.94	6.53
	Av. Income	1,892	2,658	2,477	2,333	3,310	3,842	3,761	3,703	4,536
IT	Number of obs.	1,454	53	19	6	2,157	667	759	141	1,078
	Pop. share	11.30	0.87	0.72	0.07	24.52	12.11	16.24	7.52	8.27
	Av. Income	95,813	95,662	98,881	55,312	151,190	160,868	180,183	182,237	204,340
LU	Number of obs.	583	30	13	2	735	270	255	96	190
	Pop. share	7.72	0.57	0.27	0.18	20.39	10.67	14.00	3.30	14.19
	Av. Income	13,234	19,298	20,611	23,188	28,545	34,234	38,259	41,981	41,671
NO	Number of obs.	2,811	299	128	32	3,670	1,114	1,514	703	1,008
	Pop. share	19.20	3.21	2.10	0.61	23.34	8.96	15.66	8.47	6.02
	Av. Income	833	1,173	1,177	1,161	1,506	1,783	1,834	1,575	1,862
PL	Number of obs.	4,285	544	300	112	7,205	3,394	3,673	1,306	2,909
	Pop. share	5.18	1.13	0.86	0.44	15.67	10.21	14.70	6.61	8.91
	Av. Income	1,291	2,467	2,150	1,128	2,713	3,899	3,993	5,847	3,451
RU	Number of obs.	611	122	29	2	775	417	235	30	244
	Pop. share	7.24	2.71	1.00	0.10	17.46	14.33	12.65	1.78	8.38
	Av. Income	81,577	116,695	129,707	---	158,830	206,921	232,709	219,055	233,932
SI	Number of obs.	366	29	11	---	844	304	389	57	566
	Pop. share	5.31	0.72	0.41	0.00	14.78	8.85	15.47	2.55	12.88
	Av. Income	136,816	148,559	183,587	262,288	244,017	303,077	335,658	375,155	329,689
ES	Number of obs.	818	22	11	3	1,368	462	474	80	522
	Pop. share	5.87	0.32	0.31	0.10	20.21	10.03	13.82	3.01	11.64

Note. Disposable household incomes per month (weighted) and in local currencies. Number of observation is not weighted by LIS household weights. Pop. share gives the percentage of the total weighted population that is living in the household type. A denotes adult; C denotes child. The adjacent figure gives the respective number of household members.

Table 1a. continued

Country code		A1C0	A1C1	A1C2	A1C3	A2C0	A2C1	A2C2	A2C3	A3C0
SE	Av. Income	10,444	14,222	16,859	18,363	22,793	26,192	30,401	30,736	32,141
	N	4,694	237	150	43	4,772	978	1,332	446	797
	Pop. share	23.15	2.81	2.66	1.02	24.88	8.67	15.77	6.60	4.60
CH	Av. Income	4,013	4,290	4,684	4,477	6,777	6,763	6,943	7,267	7,852
	N	895	45	40	9	1,192	307	509	172	189
	Pop. share	13.53	0.77	1.06	0.27	28.80	9.20	18.01	7.07	7.64
UK	Av. Income	907	878	966	988	1,725	1,970	2,282	2,160	2,438
	N	7,181	804	659	268	8,035	1,852	2,354	802	1,254
	Pop. share	12.06	2.25	2.70	1.49	27.75	8.53	14.28	6.10	8.48
US	Av. Income	2,029	2,117	2,266	1,886	3,995	4,511	4,870	4,672	4,935
	N	12,442	1,337	914	348	14,902	4,231	4,758	1,929	2,850
	Pop. share	10.18	2.17	2.25	1.12	23.90	10.20	14.98	7.15	6.67

Note. Disposable household incomes per month (weighted) and in local currencies. *N*s are non-weighted numbers of observations. Pop. share gives the percentage of the total weighted population that is living in the household type. A denotes adult; C denotes child. The adjacent figure gives the respective number of household members.

Table 1b. Sample description for the whole sample

Country code	Average income	N	Population share living in the nine household types	Average household size
AT	30,013	1,959	79.26	2.11
BE	89,370	1,937	87.38	2.12
EE	4,867	4,880	78.09	2.14
FI	11,635	9,406	88.78	2.01
FR	13,547	9,338	83.63	2.21
DE	4,196	10,037	87.00	1.91
GR	375,895	3,081	69.65	2.39
HU	74,418	1,586	72.43	2.20
IE	1,694	1,851	68.43	2.37
IT	3,254	6,334	71.30	2.32
LU	142,603	2,174	81.62	2.23
NO	23,741	11,279	87.57	1.99
PL	1,486	23,728	63.70	2.51
RU	2,784	2,465	65.65	2.28
SI	172,985	2,566	60.97	2.46
ES	254,001	3,760	65.31	2.37
SE	17,781	13,449	90.16	1.89
CH	5,905	3,358	86.37	2.14
UK	1,556	23,209	83.65	2.16
US	3,543	43,711	78.63	2.24

Note. Average disposable household incomes per month (weighted) of the household types taken into account, PPP adjusted in USD. N is the non-weighted number of observations per country.

Table 2. Theil coefficients by subgroups

Country code	A1C0	A1C1	A1C2	A1C3	A2C0	A2C1	A2C2	A1C3	A3C0
AT	11.77	5.52	8.30	2.21	13.37	9.36	9.26	11.03	11.77
	(1.09)	(1.42)	(3.26)	(1.11)	(1.20)	(2.22)	(1.39)	(3.39)	(1.09)
BE	16.59	7.82	10.71	3.47	80.04	13.90	10.98	8.44	16.59
	(3.90)	(2.41)	(3.76)	(2.31)	(45.84)	(6.02)	(1.58)	(1.67)	(3.90)
EE	23.88	20.35	11.46	9.68	25.57	23.85	19.40	19.65	23.88
	(2.12)	(5.50)	(1.90)	(2.29)	(3.10)	(3.14)	(1.35)	(4.03)	(2.12)
FI	14.37	7.25	4.50	4.38	15.15	9.04	8.41	12.38	14.37
	(2.22)	(1.17)	(0.74)	(1.34)	(3.27)	(2.30)	(1.67)	(4.03)	(2.22)
FR	17.35	11.93	9.91	10.10	14.18	10.17	10.70	11.10	17.35
	(0.99)	(1.55)	(1.73)	(2.88)	(0.71)	(0.68)	(0.71)	(1.17)	(0.99)
DE	17.66	8.77	14.71	2.70	13.89	10.32	13.37	8.84	17.66
	(1.66)	(1.13)	(3.02)	(0.65)	(0.90)	(0.89)	(4.09)	(1.15)	(1.66)
GR	28.80	22.11	21.28	0.00	21.87	15.66	15.81	12.96	28.80
	(3.84)	(7.88)	(5.36)	(0.00)	(1.92)	(1.47)	(1.69)	(2.66)	(3.84)
HU	21.54	18.17	4.72	4.51	14.77	20.56	12.11	14.53	21.54
	(4.38)	(5.71)	(1.64)	(2.24)	(1.62)	(3.82)	(1.32)	(6.29)	(4.38)
IE	41.41	6.91	6.35	4.95	21.28	19.88	9.57	19.55	41.41
	(17.62)	(1.29)	(2.04)	(2.17)	(1.86)	(6.96)	(1.28)	(5.77)	(17.62)
IT	22.99	12.20	14.68	15.78	23.81	15.31	16.07	35.64	22.99
	(2.68)	(2.47)	(4.54)	(8.25)	(2.65)	(1.24)	(1.43)	(11.18)	(2.68)
LU	14.63	7.07	11.31	2.22	12.22	8.59	10.54	9.43	14.63
	(1.77)	(1.24)	(3.43)	(1.11)	(0.96)	(0.67)	(1.13)	(1.73)	(1.77)
NO	14.33	11.82	5.79	2.68	17.36	7.44	12.82	26.18	14.33
	(1.05)	(3.46)	(1.22)	(0.91)	(2.45)	(1.01)	(4.67)	(11.35)	(1.05)
PL	14.35	16.99	12.13	12.73	13.50	16.04	16.46	16.38	14.35
	(0.67)	(1.81)	(1.44)	(3.37)	(0.67)	(0.65)	(0.77)	(1.39)	(0.67)
RU	41.17	45.63	35.57	0.00	52.46	51.95	31.95	60.62	41.17
	(6.14)	(6.48)	(10.62)	(0.00)	(16.23)	(10.83)	(2.68)	(18.12)	(6.14)
SI	14.32	10.66	13.76	---	14.00	8.96	8.15	7.15	14.32
	(1.37)	(3.29)	(4.74)	(---)	(1.30)	(0.90)	(1.26)	(1.30)	(1.37)
ES	27.61	14.69	22.06	20.92	23.35	16.38	19.60	35.24	27.61
	(2.08)	(5.05)	(5.76)	(11.07)	(3.52)	(2.25)	(1.35)	(8.84)	(2.08)
SE	13.09	9.56	5.62	4.28	10.38	8.78	19.25	10.43	13.09
	(0.77)	(2.53)	(1.31)	(1.98)	(0.59)	(1.51)	(10.30)	(2.16)	(0.77)
CH	22.33	5.59	12.37	4.97	15.84	22.71	9.52	11.19	22.33
	(4.50)	(1.26)	(2.99)	(1.28)	(2.74)	(13.13)	(1.43)	(1.63)	(4.50)
UK	32.85	10.06	9.36	6.06	22.60	16.25	23.69	19.90	32.85
	(6.51)	(0.68)	(0.95)	(0.86)	(1.13)	(0.72)	(3.38)	(2.25)	(6.51)
US	29.67	24.41	29.68	23.75	23.94	23.05	21.04	22.10	29.67
	(0.79)	(3.21)	(4.13)	(3.30)	(0.69)	(1.05)	(0.96)	(1.23)	(0.79)

Note. A denotes adult; C denotes child. The adjacent figure gives the respective number of household members. Standard errors in parentheses.

Table 3. Re-rankings

θ	Index	Frequencies of re-rankings of specific magnitude									Sum	Rank correlation coefficient
		5	4	3	2	1	-1	-2	-3	-4		
0.00	*T*					6	4	1			6	93.68
	G				4	2	3	2	1		10	87.37
0.05	*T*				1	6	3	1	1		8	90.53
	G		1		2	3	2	3	1		11	86.32
0.1	*T*				1	5	4		1		7	91.58
	G	1		1	1	2	4	1	2		12	84.21
0.15	*T*				1	3	5				5	94.74
	G			2	1	3	6	1	1		11	87.37
0.2	*T*				1	3	5				5	94.74
	G				3	3	3	1		1	9	89.47
0.25	*T*			1		3	4	1			6	92.63
	G				2	5	3	1		1	9	89.47
0.3	*T*				1	3	1	2			5	93.68
	G				2	3	4		1		7	92.63
0.35	*T*				1	3	3	1			5	94.74
	G				2	4	3	1	1		8	90.53
0.4	*T*				1	4	4	1			6	93.68
	G				2	4	2	3			8	91.58
0.45	*T*					7	3	2			7	92.63
	G				3	2	2	3			8	91.58
0.5	*T*				1	5	3	2			7	91.58
	G			1	2	1	2	3			8	90.53
0.55	*T*				2	1	3	1			5	93.68
	G				1	1	1	1			3	95.79
0.6	*T*				1	1	1	1			3	95.79
	G					1	1				1	96.84
0.65	*T*					4	2	1			4	95.79
	G				1	1	3				3	96.84
0.7	*T*					3	1	1			3	96.84
	G					1	1				1	97.89
0.75	*T*					3	1	1			3	96.84
	G					2	2				2	97.89
0.8	*T*					1	1				1	98.95
	G										0	100.00
0.85	*T*					1	1				1	98.95
	G					1	1				1	98.95
0.9	*T*					1	1				1	96.84
	G										0	100.00
0.95	*T*					1	1				1	97.89
	G										0	100.00

Note. 'Sum' is a sum of five products. Each product is: magnitude of ascends times its frequency of occurrence. Kendall's rank correlation coefficient in percent.

Table 4. Inequality estimates for equivalence-scale elasticity of 0.5

Country code	Theil (in %) Size weighted	Theil (in %) Needs weighted	Gini (in %) Size weighted	Gini (in %) Needs weighted
AT	12.02	12.29	26.38	26.70
	(1.62)	(1.03)	(1.88)	(1.11)
BE	36.73	39.57	32.89	33.84
	(16.40)	(29.05)	(4.15)	(7.24)
EE	23.80	24.42	36.37	36.75
	(1.83)	(1.96)	(0.89)	(0.98)
FI	13.42	14.21	25.36	26.24
	(2.15)	(2.07)	(1.37)	(1.66)
FR	13.53	14.10	27.94	28.48
	(1.20)	(1.17)	(1.16)	(1.04)
DE	14.73	15.34	28.27	28.95
	(1.31)	(1.36)	(1.23)	(1.03)
GR	18.90	19.89	33.56	34.33
	(1.89)	(2.45)	(1.49)	(1.92)
HU	15.47	16.17	29.22	29.74
	(2.79)	(1.95)	(2.13)	(1.41)
IE	20.55	22.57	33.46	34.83
	(6.54)	(1.55)	(4.16)	(1.06)
IT	21.05	21.35	33.63	33.77
	(1.73)	(1.99)	(1.03)	(1.12)
LU	11.77	12.10	26.48	26.72
	(0.74)	(0.99)	(0.70)	(0.88)
NO	16.66	16.88	26.19	27.01
	(2.08)	(1.67)	(1.53)	(1.08)
PL	15.95	15.70	29.88	29.62
	(0.63)	(0.63)	(0.65)	(0.63)
RU	45.02	45.84	46.42	46.49
	(6.66)	(6.49)	(2.31)	(2.11)
SI	11.52	12.18	25.98	26.75
	(1.37)	(1.47)	(1.68)	(1.67)
ES	21.12	21.61	34.68	35.04
	(2.14)	(3.04)	(1.44)	(1.88)
SE	13.90	14.07	25.86	26.60
	(2.75)	(2.44)	(1.35)	(1.50)
CH	16.97	17.63	28.85	29.32
	(2.35)	(2.53)	(1.32)	(1.31)
UK	23.73	24.57	35.02	35.45
	(1.55)	(2.30)	(0.85)	(0.98)
US	24.95	25.53	37.14	37.61
	(1.77)	(1.46)	(1.36)	(1.14)

Note. Standard errors (in %) in parentheses.

Figure 1. Household type specific ratios of population shares

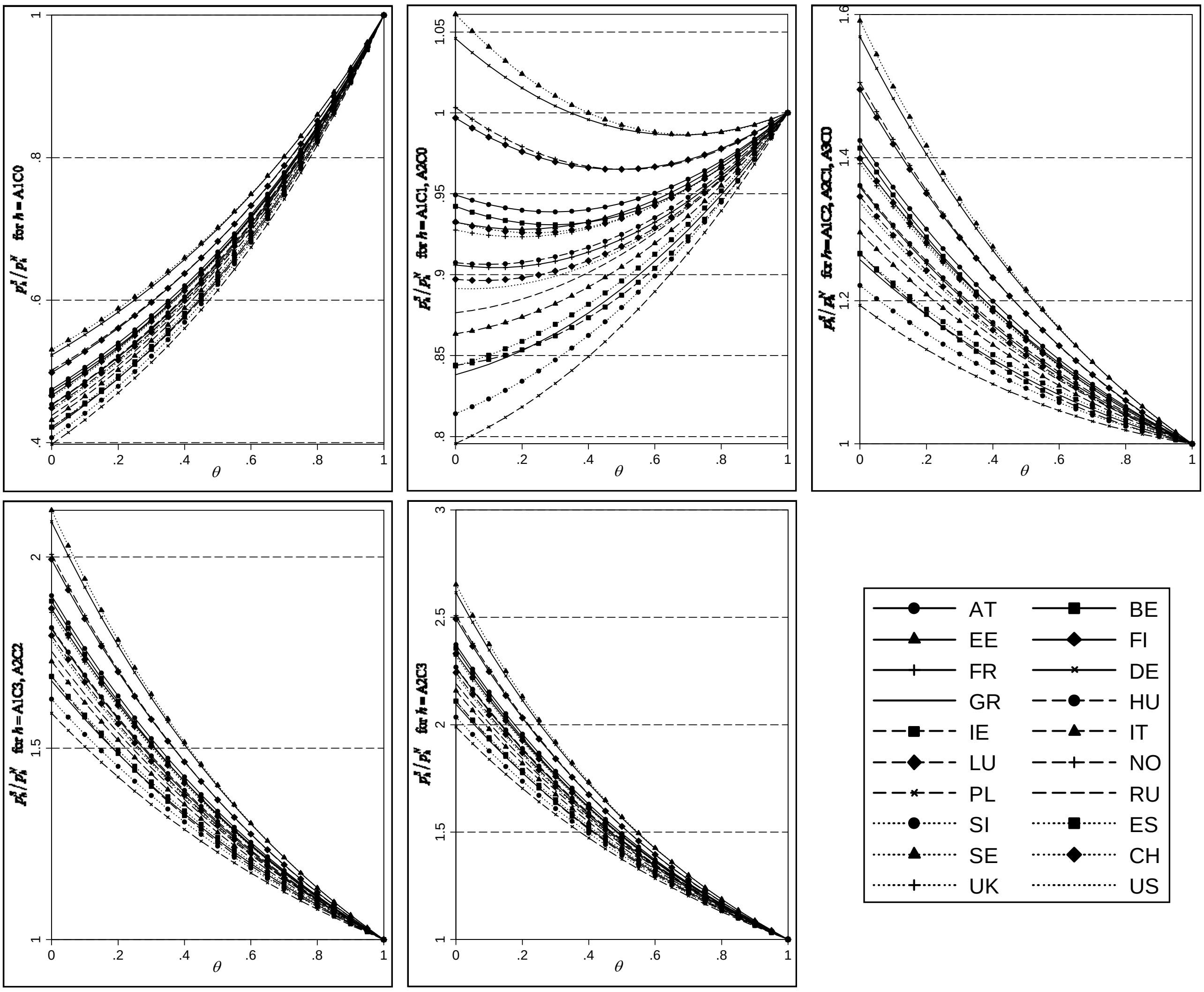
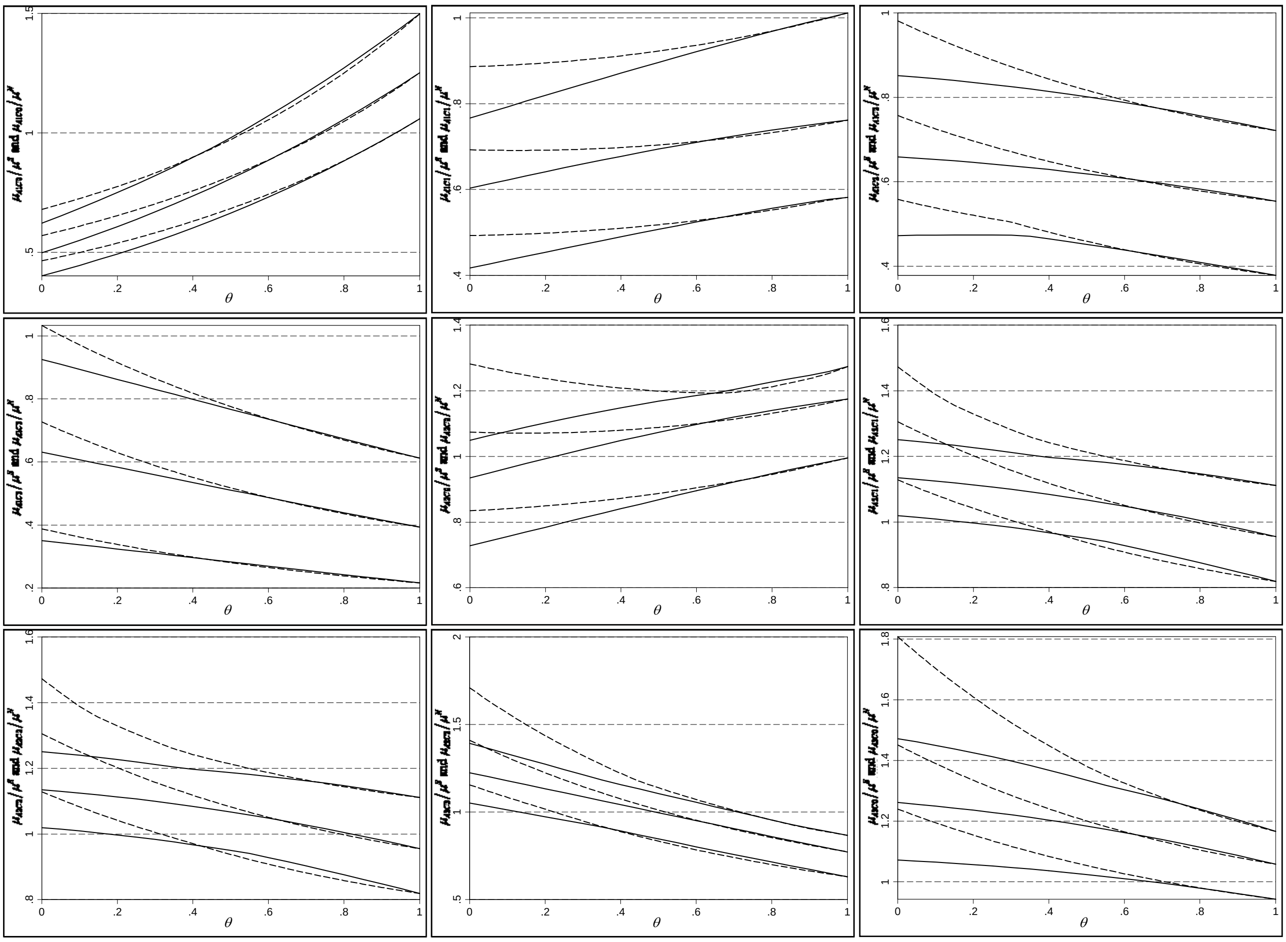


Figure 2. Household type specific mean equivalent income ratios



Note: --- S-weighting; — N-weighting; A1C3 without Greece (one HH only) and Slovenia (no observations).

Figure 3. Overall mean equivalent income ratio

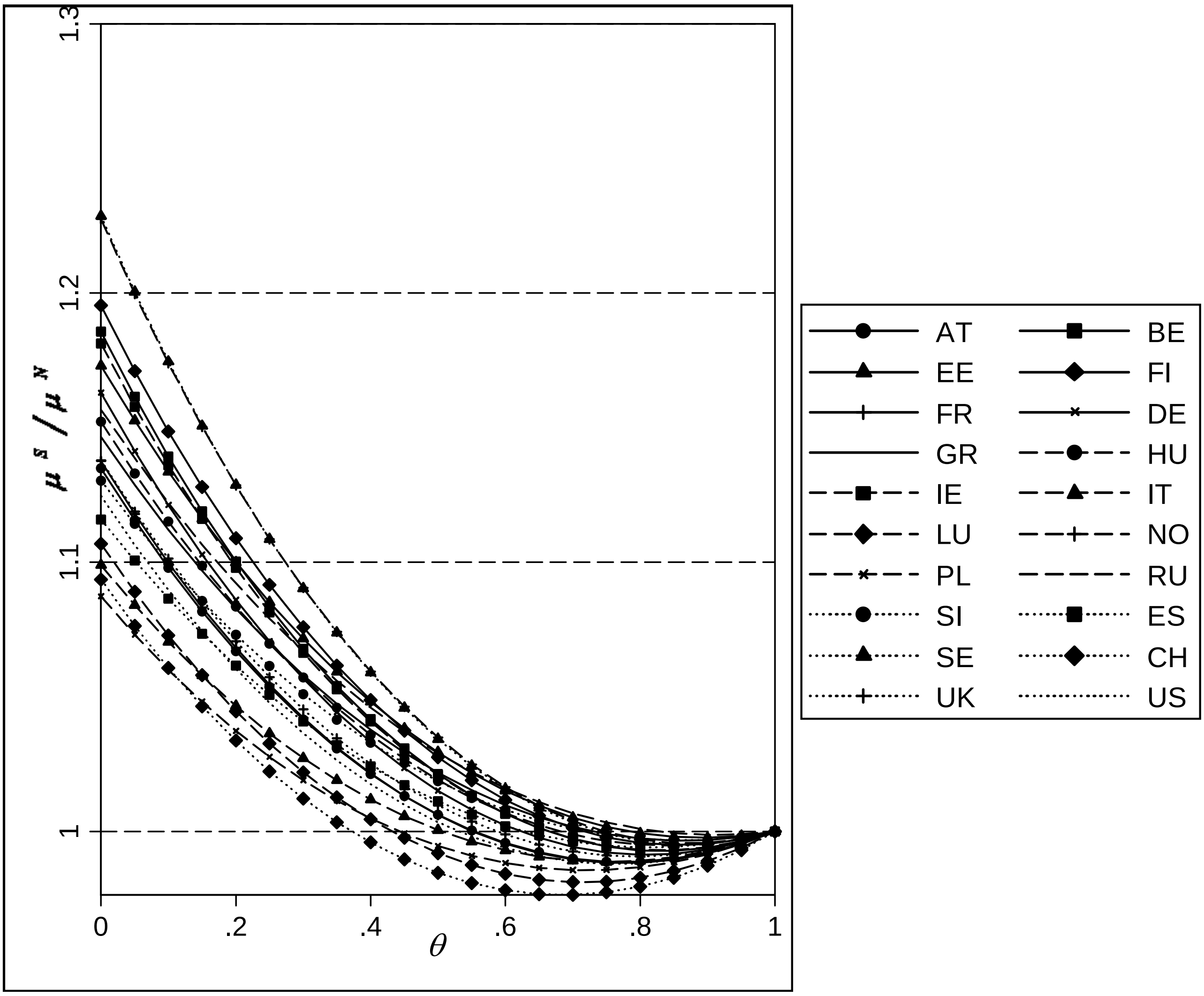


Figure 4. Household type specific ratios of equivalent income shares.

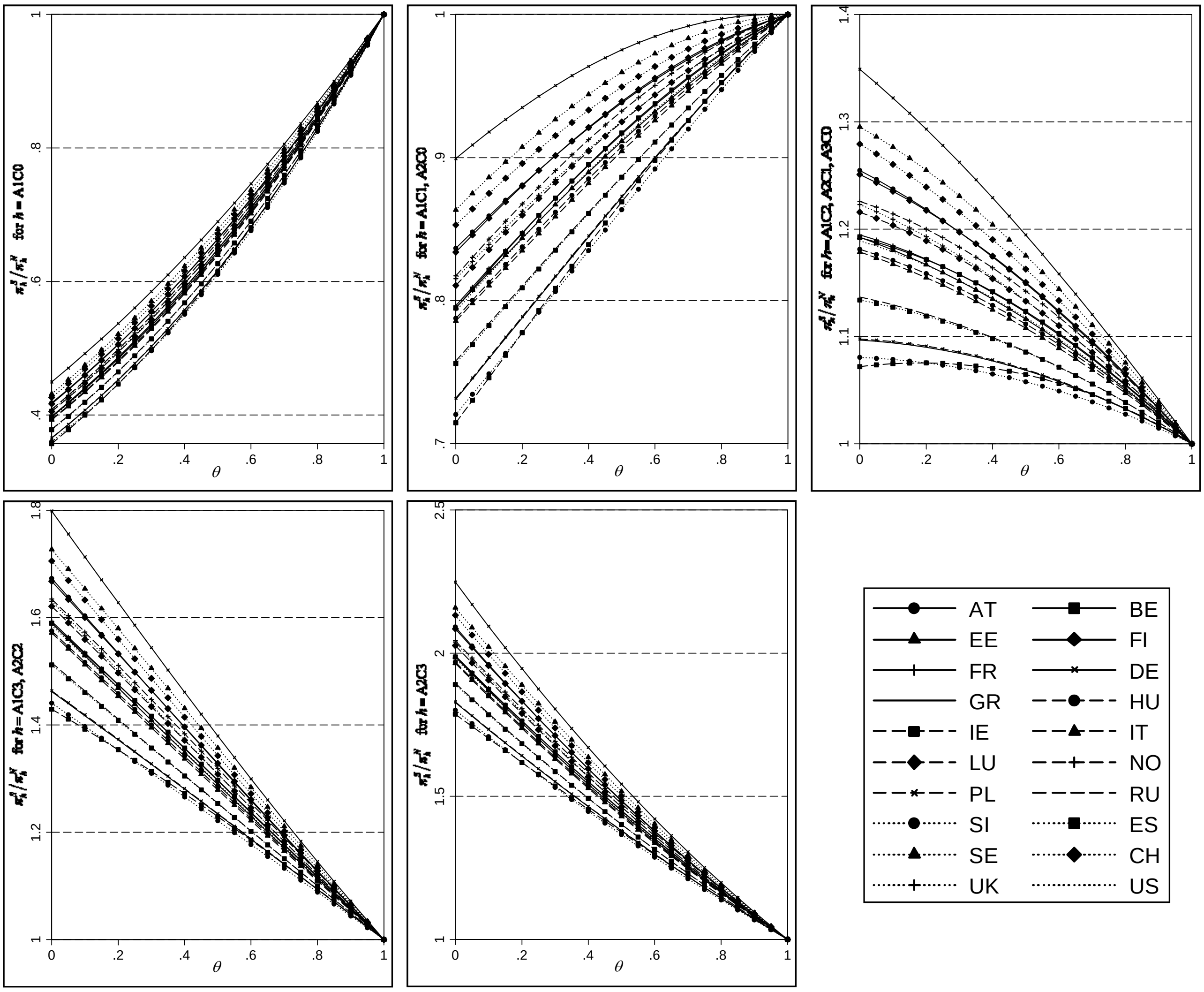


Figure 5. Theil coefficient and component ratios

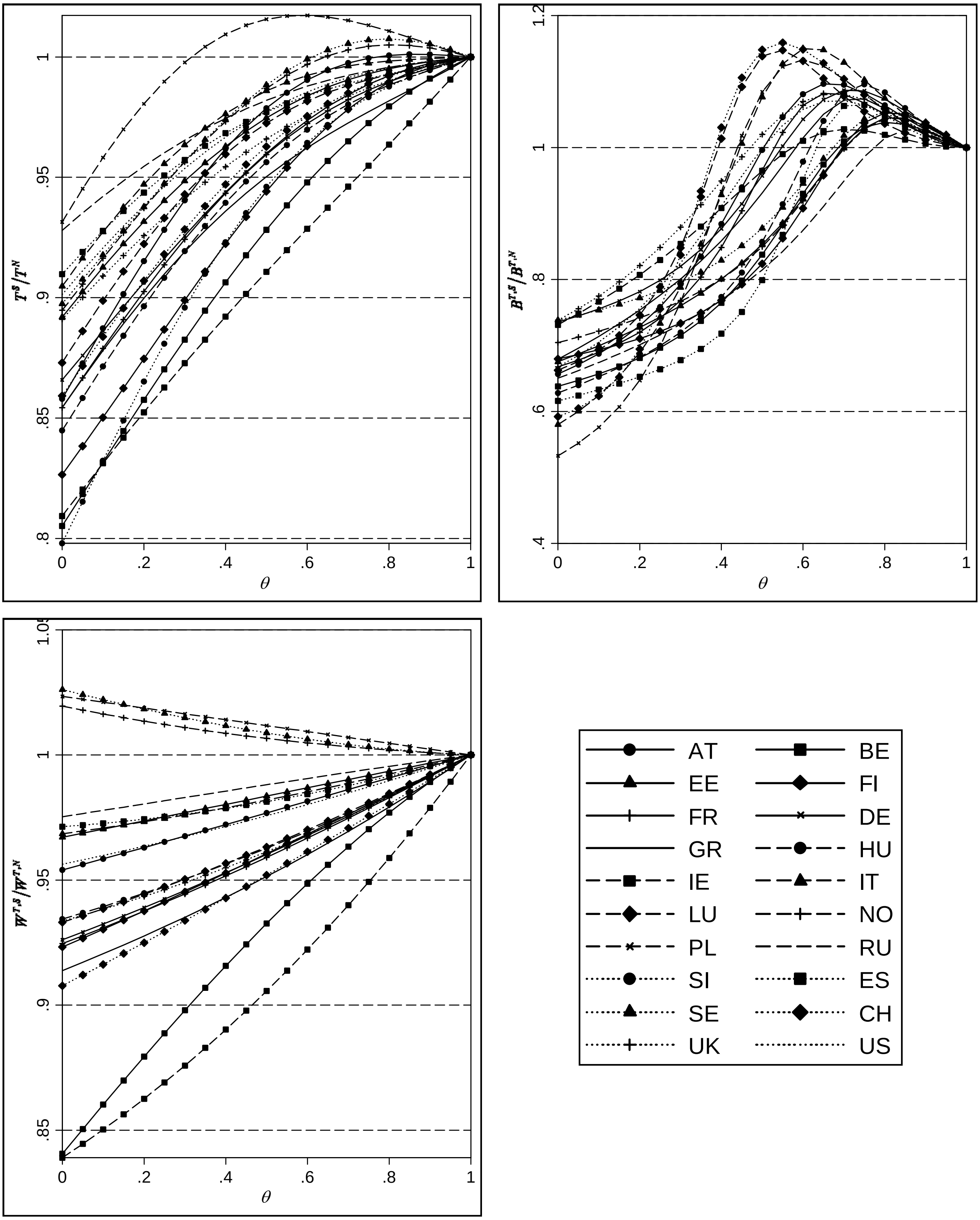


Figure 6. Gini coefficient and component ratios

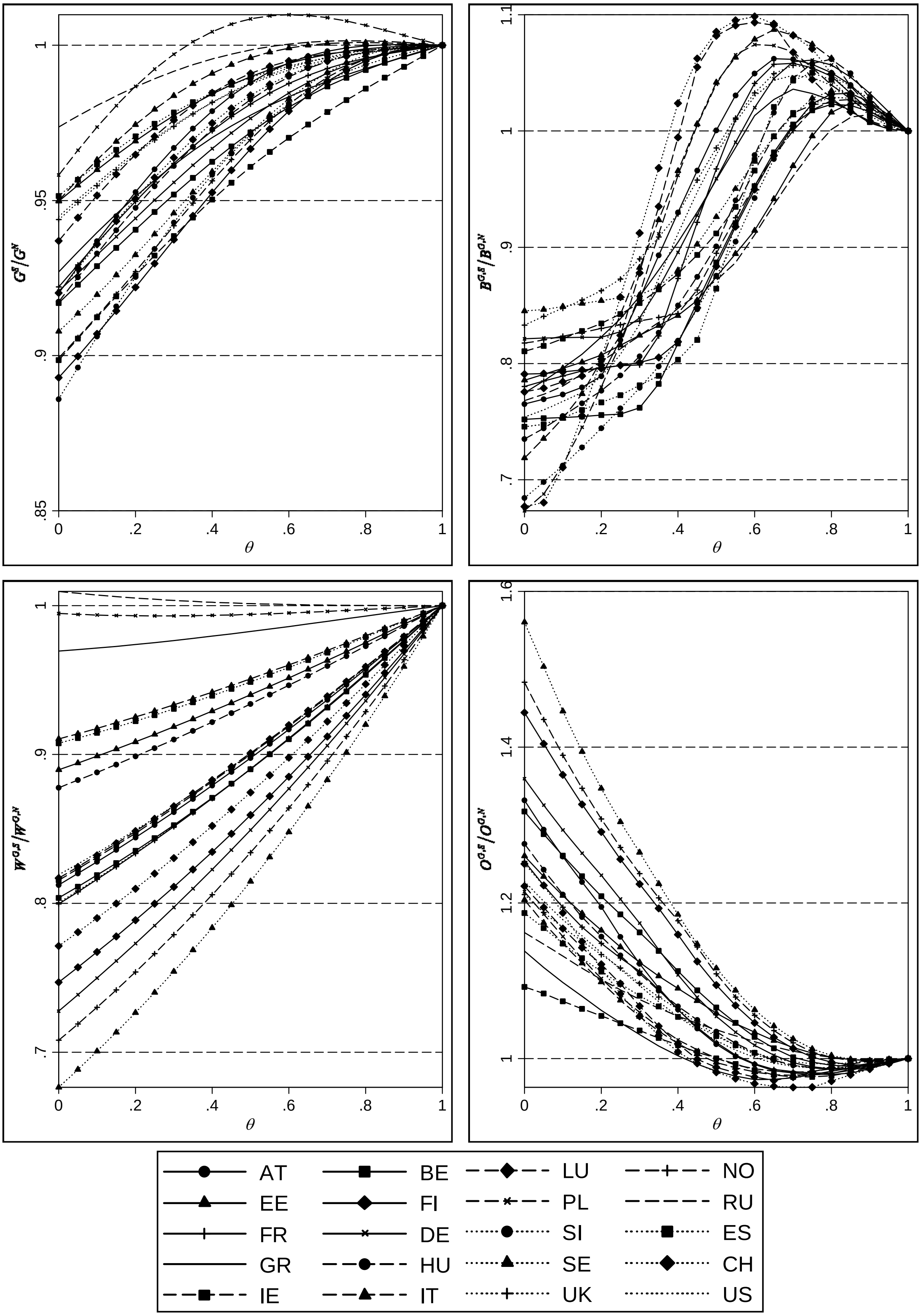
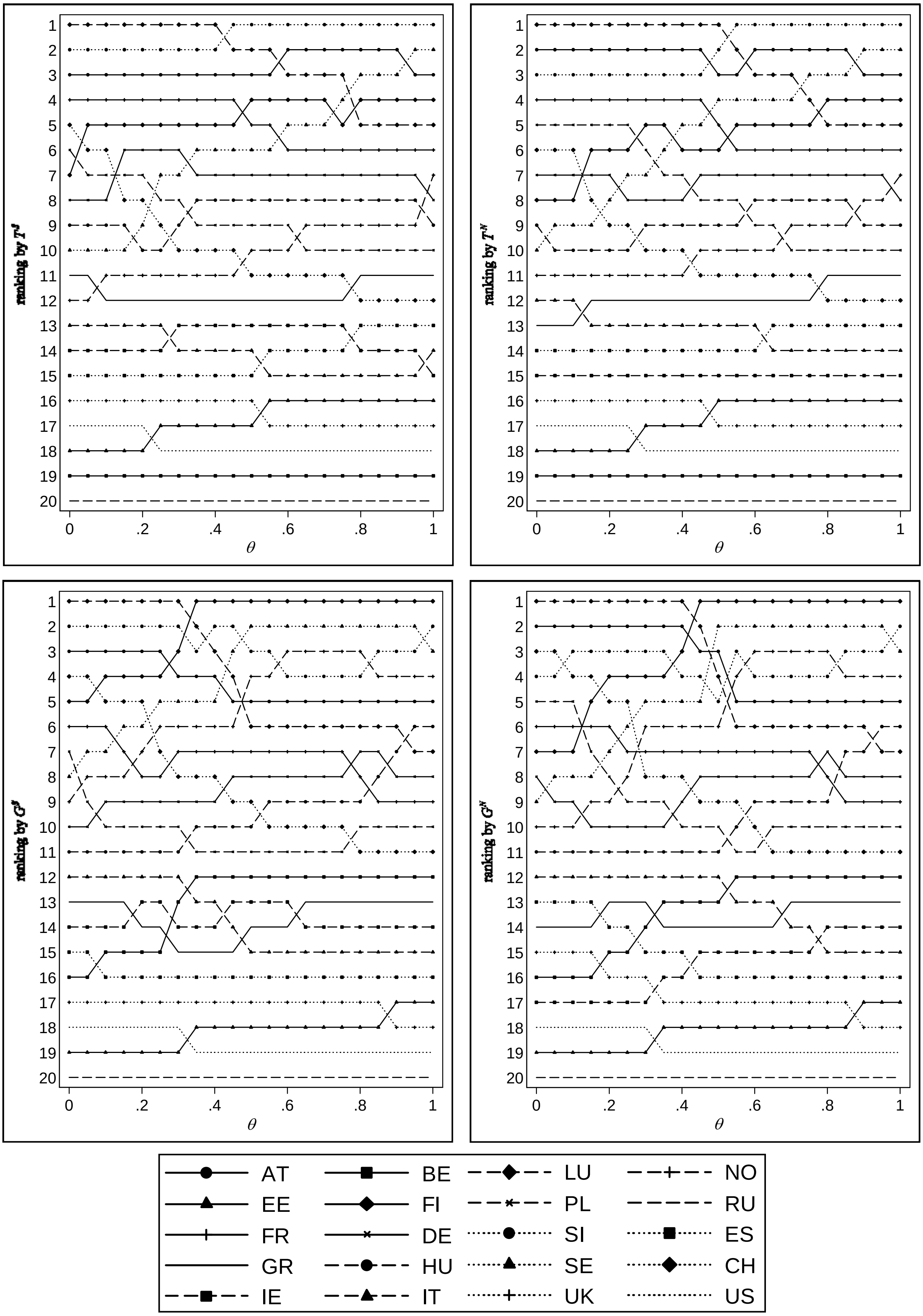


Figure 7. Country rankings



Appendix

Table A1. Data files

Country	Country code	LIS-File
Austria[a)]	AT	at00h
Belgium[a)]	BE	be00h
Estonia	EE	ee00h
Finland[a)]	FI	fi00h
France[a)]	FR	fr00h
Germany[a)]	DE	de00h
Greece[a)]	GR	gr00h
Hungary	HU	hu99h
Ireland[a)]	IE	ie00h
Italy[a)]	IT	it00h
Luxembourg[a)]	LU	lu00h
Norway	NO	no00h
Poland	PL	pl99h
Russia	RU	ru00h
Slovenia	SI	si99h
Spain[a)]	ES	es00h
Sweden	SE	se00h
Switzerland	CH	ch00h
United Kingdom	UK	uk99h
United States	US	us00h

Table A2. Gini coefficients by subgroups

Country	A1C0	A1C1	A1C2	A1C3	A2C0	A2C1	A2C2	A1C3	A3C0
AT	26.40	17.93	20.67	9.70	27.80	22.29	22.91	24.17	26.40
	(1.12)	(2.44)	(4.58)	(4.87)	(1.12)	(2.13)	(1.49)	(3.79)	(1.12)
BE	27.28	20.47	24.59	12.17	44.16	24.04	24.85	21.75	27.28
	(1.90)	(3.27)	(4.43)	(4.90)	(10.24)	(3.34)	(1.65)	(2.31)	(1.90)
EE	35.81	33.48	26.39	24.79	35.97	35.54	34.40	33.43	35.81
	(1.46)	(3.58)	(2.16)	(3.06)	(1.44)	(1.62)	(1.17)	(3.12)	(1.46)
FI	26.49	20.52	16.44	14.82	25.52	21.00	19.86	22.53	26.49
	(0.86)	(1.52)	(1.40)	(3.00)	(0.79)	(1.40)	(0.94)	(2.31)	(0.86)
FR	30.91	26.61	24.04	23.98	28.54	24.53	24.97	24.76	30.91
	(0.56)	(1.50)	(1.70)	(3.59)	(0.50)	(0.79)	(0.74)	(1.24)	(0.56)
DE	30.83	23.17	30.00	12.58	27.80	24.55	24.11	22.66	30.83
	(0.86)	(1.43)	(3.29)	(1.86)	(0.62)	(0.95)	(1.75)	(1.27)	(0.86)
GR	39.97	34.49	35.60	0.00	35.46	31.16	30.80	27.83	39.97
	(1.77)	(7.19)	(5.14)	(0.00)	(1.08)	(1.44)	(1.47)	(2.70)	(1.77)
HU	31.19	31.90	16.47	14.98	28.18	34.06	26.67	25.30	31.19
	(2.51)	(5.41)	(3.92)	(7.43)	(1.34)	(2.96)	(1.39)	(4.96)	(2.51)
IE	42.58	21.10	19.81	16.93	35.20	31.76	23.57	31.64	42.58
	(6.71)	(2.13)	(3.29)	(4.48)	(1.36)	(5.30)	(1.54)	(3.71)	(6.71)
IT	34.51	26.34	29.68	29.22	34.48	29.71	30.44	39.95	34.51
	(1.28)	(2.63)	(5.21)	(7.98)	(1.18)	(1.11)	(1.24)	(5.18)	(1.28)
LU	27.96	21.36	25.54	10.44	27.17	23.21	25.15	24.08	27.96
	(1.33)	(1.97)	(5.08)	(5.23)	(0.86)	(0.93)	(1.22)	(2.02)	(1.33)
NO	27.49	21.93	17.27	12.01	26.21	19.18	20.89	25.50	27.49
	(0.62)	(2.09)	(1.84)	(2.24)	(1.02)	(0.92)	(1.68)	(4.33)	(0.62)
PL	27.50	30.80	26.77	25.48	27.06	30.10	30.04	30.21	27.50
	(0.45)	(1.31)	(1.38)	(2.91)	(0.39)	(0.46)	(0.49)	(0.84)	(0.45)
RU	41.85	50.37	44.71	0.00	44.59	50.06	43.70	55.37	41.85
	(2.53)	(3.07)	(6.94)	(0.00)	(3.79)	(3.41)	(1.76)	(7.52)	(2.53)
SI	29.20	24.09	29.27	---	28.40	23.23	21.30	21.16	29.20
	(1.41)	(3.56)	(5.54)	(---)	(0.95)	(1.10)	(1.24)	(1.95)	(1.41)
ES	38.70	29.18	36.92	32.77	35.64	30.49	34.07	43.39	38.70
	(1.25)	(5.33)	(5.17)	(14.48)	(1.46)	(1.60)	(1.08)	(4.73)	(1.25)
SE	26.72	21.03	16.87	14.08	24.04	20.66	22.79	21.23	26.72
	(0.42)	(2.08)	(1.68)	(2.86)	(0.40)	(1.06)	(2.93)	(1.77)	(0.42)
CH	31.67	18.70	26.96	17.63	28.69	26.46	22.25	25.65	31.67
	(1.90)	(2.24)	(3.07)	(2.66)	(1.18)	(4.47)	(1.11)	(1.87)	(1.90)
UK	36.96	23.73	22.22	17.96	34.99	30.37	32.73	32.21	36.96
	(1.33)	(0.69)	(0.89)	(1.16)	(0.47)	(0.58)	(1.28)	(1.30)	(1.33)
US	40.57	35.82	39.17	35.79	36.44	34.93	33.54	34.55	40.57
	(0.37)	(1.49)	(1.99)	(2.15)	(0.39)	(0.69)	(0.63)	(0.85)	(0.37)

Note. A denotes adult; C denotes child. The adjacent figure gives the respective number of household members. Standard errors in parentheses.