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Country Inequality Rankings and Conversion Schemes

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Abstract Two conversion schemes are usually employed for assessing personal-income inequality from household equivalent incomes: to weight household units by size or by needs. Using data from the Luxembourg Income Study, the authors show the sensitivity of country inequality rankings to conversion schemes and explain the finding by means of inequality decomposition. A bootstrap approach is implemented to test for statistical significance of the results.

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1 Introduction

Researchers and the public are eager to know about the distribution of living standards in a society. Living standard of a household's members is determined by the material comfort derived from available goods and services. Economists consider the income distribution as a close proxy for the distribution of living standard. When heterogeneous household types are involved two complications emerge. First, different household types have different needs. Members of differently sized/structured households with the same household income may attain different living standards. To obtain a measure that reflects differences in living standards across household types, household incomes must be adjusted for differences in needs. Second, for reasons concerning possible violations of axiomatic properties of inequality measures,[1] household size heterogeneity also raises the issue of an adequate weighting of each household observation when the distribution of living standards is derived.

A broad consensus exists concerning the differences-in-needs adjustment procedure. Usually, household incomes are deflated by so-called equivalence scales. Equivalence scales are measures of intra-household sharing potential and differences in family members' needs (i.e., of adults vs. children). Normalizing the equivalence scale of a childless one-adult household to a value of one, an equivalence scale gives the percentage change in household income required to maintain the household's living standard as household members are added. Accordingly, equivalence scales measure household-size economies. Dividing household income by equivalence scale gives the needs-adjusted *equivalent income* of the household.

Concerning the weighting of household observations, the traditional approach in inequality measurement is a weighting of each and every household observation by *household size*.[2] As an example, when the Theil index is derived from a distribution of needs-adjusted equivalent incomes, a one-member household is assigned a weight equal to one and a four-member household is assigned a weight of four. Size weighting accommodates the principle of normative individualism: any person is considered as important as any other and is assigned the same weight. Accordingly, the size-weighted equivalent-income distribution depicts differences in living standards among individuals.

Although size weighting seems straightforward and intuitive, there is a lively debate, since decades ago, about its foundation in the context of inequality, poverty, redistribution and

[1] For a rigorous analysis regarding the possibility of such violations of axiomatic principles in inequality measurement, see, for example, Ebert and Moyes (2003).

horizontal equity analyses (see, for example, Vickrey, 1947, Bruno and Habib, 1976, Pyatt, 1990, Bottiroli Civardi and Martinetti Chiappero, 1995, and Cowell, 2000). Particularly, some authors advocate a weighting of households *by needs*, i.e. by households' equivalence scales.[3] The so derived needs-weighted equivalent-income distribution depicts differences in living standards of equivalent adults. The specific characteristic of a needs weighted distribution is that income transfers between households leave the aggregate equivalent income unaltered. This property is violated if units are size-weighted and income transfers involve heterogeneous household types. Consider the following household income distributions:

Income	Number of household members	Equivalence scale
1	1	1
3	3	2

In this example, total equivalent income amounts to $1\cdot(1/1)+(3/2)\cdot 2=4$ in case of needs weighting, as opposed to $1\cdot(1/1)+(3/2)\cdot 3=5.5$ when households are weighted by size. Now, let there be a transfer of 0.3 income units from the three-member to the one-member household. The transfer leaves total equivalent income unaffected when households are needs weighted: $1\cdot(1.3/1)+(2.7/2)\cdot 2=4$. On the contrary, size weighting indicates a reduction in total equivalent income: $1\cdot(1.3/1)+(2.7/2)\cdot 3=5.4$ as opposed to 5.5 before the transfer. The reduction in total equivalent income results from the fact that the one-member household has no economies of household size and is thus a rather inefficient vehicle for converting income into equivalent income units.[4] Characterizations of size and needs weighted distributions can be found in the theoretical works of Ebert (1999, 2004), Ebert and Moyes (2003), and Shorrocks (2004).[5]

[2] Weighting by size, for example, is recommended by the *World Institute for Development Economics and Research* (undated) and also by the *Luxembourg Income Study*, 2009.
[3] Or by a factor that is proportional to an equivalence scale.
[4] Size weighted total equivalent income increases when income is redistributed from the less efficient (one-member) to the more efficient (multi-member) household unit.
[5] Albeit its properties being appealing in some contexts, the information content of a needs weighted distribution is open to debate. As O'Higgins et al. (1989, p. 26) stressed and Podder and Chatterjee (2002, p. 11) later reechoed: "Equivalent adults do not exist, unlike families or individuals, although a family or an individual may have an equivalent income." Bruno and Habib (1976, p. 63) express a similar discomfort using the words of one of their colleagues, Yoram Ben-Porath: "If it costs less to make a person happy it still does not make him less a person."

The problem we are concerned with here is the role of weighting schemes in ranking personal-income inequality across countries.[6] Our first contribution is to provide a systematic sensitivity analysis of country inequality rankings to the two weighting schemes mentioned above, a weighting by size versus needs. In particular, we want to answer questions of the following type: "For a given inequality index and a given equivalence scale, do positions of the United States and France in a country inequality ranking differ when households are weighted by needs rather than size?" The sensitivity of country rankings to weighting procedure is scrutinized for different inequality indices at different levels of household-size economies. Rankings are derived from a set of 20 countries from the Luxembourg Income Study, and bootstrapping techniques are applied to testing for significance of the results. To our knowledge, this is the first systematic sensitivity analysis of cross-country inequality rankings to using alternative weighting schemes.

Indeed, country inequality rankings turn out to be sensitive to the choice of weighting schemes. Apart from very low levels of household-size economies, Kendall's tau is always significantly different from 1, indicating that the association of size and needs weighted country inequality rankings is not perfect. Moreover, the association tends to become weaker with the presumed level of household size economies.

Our second contribution is the identification of the mechanics underlying the differences in rankings obtained from size and needs weighted distributions. An inequality decomposition by household types serves as the technical workhorse. The decomposition expresses overall inequality as the sum of inequality within and between population subgroups (household types). Both the within-group and the between-group component are sensitive to changing household weighting. We show that the quantitative effect hinges on the interplay of household-type specific inequality levels (and differences in the levels across household types), household-type specific mean incomes, and the relative frequencies of households of specific type. All these factors are country-specific. Consequently, switching from one weighting scheme to another may well affect measured inequality differently in one country compared to another, with implications for the positions of the countries in inequality rankings.

Here is a roadmap to our paper. Section 2 introduces the database. Section 3 introduces all the concepts, including the applied inequality indices, the bootstrap method, and the inequality decomposition by population subgroups. Section 4 summarizes our findings concerning the

[6] Interesting recent contributions that deal with the robustness and sensitivity of country rankings to alternative specifications of a given underlying measure include Anderson et al. (2010), Cherchye et al. (2008), Chowdhury

sensitivity of country rankings to weighting procedure. Section 5 explores the underlying mechanics by means of inequality decomposition. Section 6 concludes the paper.

2 Database and data preparation

Our empirical examination is based on Luxembourg Income Study (LIS) data. For 30 countries and several years, the LIS provides representative micro-level information on private households' incomes and demographic characteristics (e.g., number, age and gender of each family member). To keep the empirical analysis tractable, we consider 20 countries (the United States and 19 European countries) from a single cross section.[7] Additionally, the analysis is restricted to data from nine household types: one- and two-adult households with zero up to three children, and childless three-adult households.[8] Tables A1 and A2 in the Appendix provide the country codes and several non-weighted country-specific characteristics.[9]

Our computations rely on the LIS variable 'household disposable income'. Household disposable income is harmonized across countries, covers labor earnings, property income, and government transfers in cash minus income and payroll taxes.[10] It is denoted in local currencies. We have removed household observations with missing information or with negative values of disposable income. Moreover, to avoid outlier-driven biases of inequality estimates, we have trimmed the data following standard conventions: the one percent observations with the highest and with the lowest incomes have been discarded.

To derive equivalent income from household disposable income, we apply a parametric equivalence scale suggested in Buhmann et al. (1988). It allows for variations in household-size economies through a single parameter, the so-called 'equivalence-scale elasticity.' The Buhmann et al. (1988) equivalence scale is $ES(n_i,\theta)=(n_i)^{\theta}$, where n_i denotes the number of household members living in household unit i. Hence, household-size economies are captured by the parameter θ, with $0 \le \theta \le 1$. Accordingly, equivalent income is $y_i\left(y_i^d, n_i, \theta\right) = y_i^d \big/ ES\left(n_i,\theta\right)$ where y_i^d denotes household i's disposable income.

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and Squire (2006), and Permanyer (2011).

[7] The underlying LIS datasets from years 1999/2000 are surveyed in Table A1 in the Appendix.

[8] 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.

[9] We provide the non-weighted 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 on the basis of weighted distributions.

[10] For the exact definition of disposable household income see Luxembourg Income Study (2006), and for its cross-country comparability Burkhauser et al. (1996) and references therein.

Concerning the level of household size economies, two extreme cases can be considered. If $\theta = 0$, equivalent income and disposable income are the same for all household types since $ES(n_i, 0) = 1 \; \forall i$. Due to perfect household-size economies, 'n household members live as cheap as one' and the same weight – irrespective of household size – is assigned to all household units in the needs weighted distribution. If $\theta = 1$, household-size economies cannot be achieved and 'one n-member household lives as cheap as n one-member households.' In this special case, size and needs weighting assign identical household weights as $ES(n_i, 1) = n_i \; \forall i$.

3 Measurement concepts

3.1 Inequality indices, country rankings and rank correlation

We measure inequality with indices from the generalized entropy class, $GE(a)$, derived from the analogy between income distribution and information theory. The parameter a determines the sensitivity of $GE(a)$ with respect to changes at the top of the income distribution. The larger is a, the more sensitive is $GE(a)$. Consider a population of $i = 1, ..., I$ households with equivalent incomes $y_i\left(y_i^d, n_i, \theta\right)$. Each observation i is assigned a weight w_i^t with $t \in \{S, N\}$, where S denotes size and N needs weighting. In case of S-weighting, a household's weight is $w_i^S = n_i \cdot f_i \Big/ \left(\sum_{i=1}^{I} n_i \cdot f_i\right)$, with f_i denoting the LIS frequency weight. In case of N-weighting, the weight is $w_i^N = ES\left(n_i, \theta\right) \cdot f_i \Big/ \left(\sum_{i=1}^{I} ES\left(n_i, \theta\right) \cdot f_i\right)$. The Generalized Entropy class of inequality indices is given by

$$(1a) \quad GE(a; t, \theta) = \frac{1}{a \cdot (a-1)} \cdot \left[\sum_{i=1}^{I} w_i^t \cdot \left(\left(\frac{y_i\left(y_i^d, n_i, \theta\right)}{\mu(t, \theta)}\right)^a - 1\right)\right], \quad a \neq 0, 1$$

$$(1b) \quad GE(1; t, \theta) = \sum_{i=1}^{I} w_i^t \cdot \frac{y_i\left(y_i^d, n_i, \theta\right)}{\mu(t, \theta)} \cdot \log\left(\frac{y_i\left(y_i^d, n_i, \theta\right)}{\mu(t, \theta)}\right)$$

$$(1c) \quad GE(0; t, \theta) = \sum_{i=1}^{I} w_i^t \cdot \log\left(\frac{\mu(t, \theta)}{y_i\left(y_i^d, n_i, \theta\right)}\right)$$

where $\mu(t, \theta) = \left(\sum_{i=1}^{I} y_i \cdot w_i^t\right) \Big/ \sum_{i=1}^{I} w_i^t$ denotes mean equivalent income – per individual in case of size weighting and per equivalent adult in case of needs weighting. For $a = 0$ we have the mean logarithmic deviation; for $a=1$, we have the Theil coefficient; and for $a=2$ we have half the square of the coefficient of variation.

Ordering all the countries in decreasing order of $GE(a;t,\theta)$ gives the country inequality ranking for a specific a, a specific weighting procedure t and a specific level household-size economies θ. With $r^l(a;t,\theta)$ we denote the rank of country $l=1,...,L$. For a given a and θ, we assess the strength of the relationship between the S- and N-weighted country inequality ranking by means of Kendall's tau, τ. Kendall's tau, like the Spearman rank correlation, is carried out on the ranks of data. Particularly, it is determined by the probability of observing concordant and discordant rank-pairs.

For pairs of ranks $\left(r^l(a;S,\theta), r^l(a;N,\theta)\right)$ and $\left(r^m(a;S,\theta), r^m(a;N,\theta)\right)$ of countries $l \neq m$ define them as concordant if $\left(r^l(a;S,\theta)-r^m(a;S,\theta)\right)\cdot\left(r^l(a;N,\theta)-r^m(a;N,\theta)\right)>0$, and discordant if the product is negative.[11] Let $P(a;\theta)$ and $Q(a;\theta)$ denote the number of concordant respectively discordant pairs, then

$$(2)\quad \tau(a;\theta)=\frac{P(a;t,\theta)-Q(a;t,\theta)}{L\cdot(L-1)/2}.$$

Kendall's tau takes values between -1 and +1, with a positive (negative) value indicating that ranks obtained from S- and N-weighted distributions are positively (negatively) correlated. For $\tau=1$, the positive correlation is perfect, i.e. S- and N-weighted ranks of all countries coincide.

3.2 Inequality decomposition

To understand the mechanics underlying the differences in size and needs weighted country inequality rankings, i.e. $\tau \neq 1$, we conduct an inequality decomposition by household types. Suppose there is an exhaustive partition of the population into mutually-exclusive subgroups $k=1,...,K$. The basic idea is to express overall inequality as a function of inequality within and between population subgroups. We partition the population into nine subgroups, distinguished by household composition.

Decomposability of an inequality index implies a coherent relationship between inequality in the whole population and inequality in its constituent mutually exclusive 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 term based on mean equivalent incomes and subgroup sizes. Indices of the generalized-entropy family are additively decomposable and can be written as

$$(3)\quad GE(a;s,\theta)=GEW(a;s,\theta)+GEB(a;s,\theta),$$

where GEW is within-group inequality, and GEB is between-group inequality. Within-group inequality is defined as

$$(4a)\quad GEW(a)=\sum_{k=1}^{K} q_k^t \cdot \left(\frac{\mu_k^t}{\mu^t}\right)^a \cdot GE_k(a), \quad a\neq 0,1$$

$$(4b)\quad GEW(1)=\sum_{k=1}^{K} q_k^t \cdot \frac{\mu_k^t}{\mu^t} \cdot GE_k(1)$$

$$(4c)\quad GEW(0)=\sum_{k=1}^{K} q_k^t \cdot GE_k(0)$$

The first expression in equations (4a) to (4c), q_k^t, denotes the population share living in household type k. Depending on the chosen weighting procedure, the population share of type-k households equals

$$(5a)\qquad q_k^S=\frac{\sum_{i_k=1}^{I_K} w_{i_k}^S}{\sum_{k=1}^{K}\sum_{i_k=1}^{I_K} w_{i_k}^S}$$

$$(5b)\quad q_k^N(\theta)=\frac{\sum_{i_k=1}^{I_K} w_{i_k}^N(\theta)}{\sum_{k=1}^{K}\sum_{i_k=1}^{I_K} w_{i_k}^N(\theta)},$$

where I_k denotes the (non-weighted) number of household observations of type k. S-weighted population shares are constant and do not depend on household-size economies θ. On the opposite, N-weighted population shares are dependent on θ: The higher is θ, the lower is the population share of the larger households relative to the smaller.

The second expression in (4a) and (4b), μ_k^t/μ^t is the ratio of average equivalent income of type k households relative to the population-wide mean with

[11] In the technical description we assume that ties in the country ranking do not exist.

$$(6a) \quad \mu_k^S = \mu_k^N = \frac{\sum_{i_k=1}^{I_K} f_{i_k} \cdot y_{i_k}\left(y_{i_k}^d, n_{i_k}, \theta\right)}{\sum_{i_k=1}^{I_K} f_{i_k}}$$

$$(6b) \qquad \mu^t = \sum_{k=1}^{K} q_k^t \cdot \mu_k^t .$$

Average equivalent income of type k households is the same for both weighting schemes, whereas average equivalent income across households depends on the weighting scheme via the population shares.

The last expression in (4a) to (4c), $GE_k(a)$ describes inequality in subgroup k. It is calculated as if the subgroup k were a separate population. Due to the fact that all households of a particular subgroup are homogeneous with respect to size, $GE_k(a)$ is the same for both types of weighting.

The between-group inequality component, $GEB(a)$, is defined as

$$(7a) \quad GEB(a) = \frac{1}{a \cdot (a-1)} \cdot \left[\sum_{k=1}^{K} q_k^t \cdot \left(\left(\frac{\mu_k}{\mu^t} \right)^a - 1 \right) \right], \quad a \neq 0, 1$$

$$(7b) \quad GEB(1) = \sum_{k=1}^{K} q_k^t \cdot \left(\frac{\mu_k}{\mu^t} \right) \cdot \ln\left(\frac{\mu_k}{\mu^t} \right)$$

$$(7c) \quad GEB(0) = \sum_{k=1}^{K} q_k^t \cdot \ln\left(\frac{\mu^t}{\mu_k} \right).$$

The between-group inequality from the size weighted distribution differs from the needs weighted as a result of differences in weighted average equivalent incomes, μ^S and μ^N, and household type-specific population weights q_k^t. In the empirical part of the paper, the results from the decomposition will serve as a vehicle for explaining the sensitivity of bilateral country inequality rankings to weighting procedure.

3.3 Bootstrap inference

To test for statistical significance of our results, we have implemented a bootstrap approach following the theoretical framework outlined in Biewen (2002). In a first step, we create a pooled database from the selected set of 20 countries. From the pooled database, we draw with replacement, $B=100$ random bootstrap samples, using countries as strata.[12] For each country, each bootstrap sample has as many sampling units as the country-specific LIS database, and each sampling unit has the same probability of being selected.[13]

Particularly, for each country we compute from each bootstrap sample b a particular measure, M^b, say the Theil index. Confidence intervals are computed following Hall (1994). Hall's confidence interval at the 95 percent level is defined as $\Pr\left(2\hat{M}^c - M^b_{0.975} \le M \le 2\hat{M}^c - \hat{M}^b_{0.025}\right) = (100-2\alpha)/100$, where $\hat{M}^c$ denotes the bootstrap bias corrected statistic, $M^b_{0.975}$ and $M^b_{0.025}$ the 2.5th upper and lower percentile in the bootstrap index distribution, and M the index's true value. The bootstrap bias-corrected index is $\hat{M}^c = \hat{M} - Bias$, where $\hat{M}$ is the index derived from the sampling distribution and $Bias = \frac{1}{B}\cdot\sum_{b=1}^{B} M^b - \hat{M}$. The bias-corrected confidence interval has advantages compared to standard confidence intervals when the underlying distribution, as it is the case for income distributions, is skewed (Hall, 1994).

To investigate whether the bilateral ranking of any two countries l and m is significantly affected by the weighting procedure, we rely on the confidence intervals' upper and lower limits. The weighting procedure has a significant effect on the bilateral ranking if

$$(8a)\quad \left[\left(2\hat{M}^c - M^b_{0.975}\right)^S_m - \left(2\hat{M}^c - M^b_{0.025}\right)^S_l\right]\cdot\left[\left(2\hat{M}^c - M^b_{0.975}\right)^N_m - \left(2\hat{M}^c - M^b_{0.025}\right)^N_l\right] < 0$$

and/or if

$$(8b)\quad \left[\left(2\hat{M}^c - M^b_{0.025}\right)^S_m - \left(2\hat{M}^c - M^b_{0.975}\right)^S_l\right]\cdot\left[\left(2\hat{M}^c - M^b_{0.025}\right)^N_m - \left(2\hat{M}^c - M^b_{0.975}\right)^N_l\right] < 0 .$$

For example, let the confidence interval for a given measure M and significance level be $[0.20;0.30]^S_l$ and $[0.26;0.34]^N_l$ for country l, respectively $[0.35;0.40]^S_m$ and $[0.31;0.37]^N_m$ for m. From (8a) and (8b), we obtain $(0.40-0.20)\cdot(0.37-0.26)>0$, and $(0.35-0.30)\cdot(0.31-0.34)<0$. As (8b) is negative, weighting has a significant effect on the bilateral ranking. More precisely, the size-weighted distribution in m is more unequal than in

[12] Our analysis requires a bootstrapping over 20 countries, 20 equivalence scales and two weighting schemes. At the same time the LIS computers' working space is limited. Although the LIS team provided us with extra computer capacity for our analyses, we had to confine ourselves to 100 bootstrap repetitions.

[13] While LIS frequency weights and households' needs/size weights are not accounted for in the bootstrap, they are always included when inequality indices (and related statistics) are derived. For technically equivalent empirical applications see Athanasopoulos and Vahid (2003) or Bönke et al. (2010).

l, while needs weighted distributions statistically exhibit the same level of inequality (confidence intervals overlap).

Taking a broader multinational perspective, we also take inequality indices to draw conclusions concerning the differences in size- and needs weighted cross-country rankings. More precisely, the procedure outlined in (8a) and (8b) is carried out on any pair of countries. If condition (8a) or (8b) is satisfied (both are rejected), a re-ranking occurs and the respective pair of countries is denoted discordant (concordant). Having identified the number of concordant pairs, $P(a;\theta)$, and discordant pairs $Q(a;\theta)$, Kendell's tau, $\tau(a;\theta)$ is derived from (2).

4 Sensitivity of country inequality rankings to weighting schemes

The sensitivity of country inequality rankings to weighting schemes is scrutinized from a bilateral and a multinational perspective. The bilateral perspective is concerned with the question whether two countries l and m are consistently ranked according to the criteria defined in equations (8a) and (8b) or not. The multinational perspective is concerned with the correlation of size and needs weighted cross-country inequality rankings as indicated by Kendall's tau. Both types of sensitivity analysis are carried out for all three entropy inequality indices at two levels of the equivalence-scale elasticity, $\theta = 0.5$ and $\theta = 0.25$. For $\theta = 0.5$, we have the 'square-root scale' extensively used in empirical inequality analyses. A household-size elasticity of 0.25 indicates substantial household-size economies.

[Tables 1a and 1b about here]

For our set of twenty countries, Table 1a and Table 1b provide the three inequality indices (point estimates) together with the respective bootstrap confidence intervals underneath. Statistics in Table 1a relate to the $\theta = 0.5$ and in Table 1b to the $\theta = 0.25$ scenario. The first number in each cell is the observed inequality index in percent. Take Poland (PL) and Slovenia (SI) when $\theta = 0.25$ as an example. Point estimates of mean logarithmic deviations, $GE(0)$, from size-weighted distributions indicate more inequality in Poland compared to Slovenia, i.e. 11.45 percent versus 11.38 percent. Overlapping confidence intervals, however, indicate that the difference is insignificant. The needs weighted distributions lead to a different conclusion, i.e. significantly more inequality in Slovenia compared with Poland.

[Tables 2a and 2b about here]

Tables 2a and 2b summarize all inconsistent bilateral rankings from the two types of weighting. Table 2a refers to the $\theta = 0.5$ scenario, while Table 2b refers to $\theta = 0.25$. For each pair of countries, the symbol "." indicates that bilateral rankings are immune to weighting for all three indices; else a three digit numerical sequence is provided. The first digit relates to a country ranking by means of the logarithmic deviation; the second to a ranking by the Theil coefficient, and the third to the half the square of the coefficient of variation. In the sequence, a "1" ("0") indicates, accordingly to the criteria (8a) and (8b), that bilateral rankings from size and needs weighted distributions are inconsistent (consistent).

For example, take the sequence "011" for Germany and Austria when $\theta = 0.5$. According to $GE(0)$, both types of weighting lead to the same conclusion, namely that there is significantly more inequality in Germany compared to Austria. According to $GE(1)$ and $GE(2)$, however, conclusions are weighting dependent. While size weighting suggests no significant difference in inequality levels in Germany and Austria, estimates from the needs weighted distributions indicate significantly more inequality in Germany.

We find a non trivial number of inconsistencies in bilateral rankings derived from size and needs weighted distributions. If we consider all the pair-wise comparisons of the 20 countries for $\theta = 0.5$, then we have six discordant pairs in case of the logarithmic deviation, nine in case of the Theil index, and five in case of half the square of the coefficient of variation. Accordingly, 3.51 percent of the comparisons yield conflicting rankings. For $\theta = 0.25$ the number of discordant pairs more than doubles. Now we have 51 discordant pairs. Correspondingly, 8.95 percent of all the bilateral rankings are sensitive to the weighting procedure. Yet, not only has the mere number of discordances risen. It is also interesting to note that some bilateral comparisons are sensitive to weighting when $\theta = 0.5$ while this is not the case when $\theta = 0.25$. Examples include Austria and Germany as well as France and Luxembourg.

The bilateral comparisons clearly indicate discrepancies that arise when switching from one weighting scheme to another. Indeed, various point estimates suggest outright reversals of country ranks when switching from one weighting scheme to another. As example consider point estimates for $GE(0)$ at $\theta = 0.5$ from Table 1a. Outright reversals concern Belgium and Slovenia, France and Poland, Finland and Norway, Germany and Poland, as well as Ireland and Italy. At $\theta = 0.25$ (Table 1b) outright reversals concern the bilateral positions of Austria and Norway, France and Slovenia, France and Sweden, Finland and Luxembourg, Ireland and United Kingdom, Norway and Switzerland, Poland and Slovenia, as well as Poland and Sweden. Confidence intervals do not support the presence of outright reversals. Rather they indicate significant differences in inequality levels for one weighting scheme and insignificant differences for the other.

[Table 3 about here]

We next turn to the multinational perspective. Numbers of discordant pairs (significant) together with rank correlation coefficients (point estimates and bootstrapped values) are provided in Table 3. As mentioned above, Kendall's tau gives the correlation of size and needs weighted cross-country inequality rankings. For all three entropy indices, the number of discordant pairs and Kendall's tau indicate a strong correlation of country inequality rankings derived from size and needs weighted distributions. At the same time, the correlation is weaker when household size economies are high (when θ is small). This impression is reconfirmed by Figure 1. In the graph, three lines are provided. Each line connects Kendall's rank correlation coefficients derived for different levels of household-size economies when countries are ranked according to a particular entropy index.[14] Take, for example Kendall's rank correlation coefficient derived from Theil index based country rankings. We have a correlation of 1.0 for $\theta \geq 0.95$, 0.989 for $\theta = 0.75$, 0.947 for $\theta = 0.5$, 0.916 for $\theta = 0.25$, and 0.895 for $\theta = 0.00$.

Kinks in the lines indicate that the relationship between τ and θ is not monotonous. This non- monotonicity is consistent with the results from the bilateral comparisons: It is not ruled out that ranks of countries are sensitive to weighting when θ is high and insensitive when θ is low.

[Figure 1 about here]

We want to point out that the sensitivity of country rankings is not a phenomenon restricted to the generalized entropy class of inequality indices. We have also experimented with several

[14] Due to hardware restrictions, we have derived the rank correlations from the observed inequality indices rather than from a bootstrap-based ranking.

other popular measures such as the Gini and the Atkinson index. The results are congruent with abovementioned conclusions.[15]

5 Decomposition analysis

This section starts with a general overview of the country-specific estimates from the inequality decomposition for both weighting schemes. Afterwards, we proceed with a detailed two-country case study. It seeks to carve out the country specifics of distributions of income and household types leading to weighting-dependent country rankings.

[Figures 2a – 2c about here]

For admissible values of household-size economies, Figures 2a-2c provide the size and needs weighted levels of inequality, inequality within and inequality between for our three inequality indices. Grey lines refer to size weighting, black lines to needs weighting. Long dashed lines depict the inequality between component, short dashed lines the inequality within component, and solid lines refer to the sum of both, i.e. to the overall inequality index.
Figures 2a-2c depict how variations of three ingredients - the functional form of the index (via variation of a), household-size economies (via variation of θ) and the type of weighting (by size versus needs) – affect the level of measured inequality in each of the twenty countries. The figures are provided for visualizing the role of weighting procedures for (bilateral) country inequality rankings. The figures are *not* intended to mislead the reader into inequality comparisons for a particular country along the dimension of one of the three ingredients. Such comparisons are meaningless as, whenever one of the ingredients is changed, we obtain a new measure.

[Table 4 about here]

For matters of space, we shall confine ourselves to one bilateral case study. Our case study involves a comparison of France and Sweden for $GE(0)$. Readers who want to perform analogous bilateral country comparisons may consult the decomposition results summarized in Tables A2 together with Tables A3a-A3c in the Appendix. For France and Sweden, Table 4 conveys point estimates of mean logarithmic deviation, the inequality between- and within-

[15] Results can be provided by the authors upon request.

group component at two levels of household size economies, i.e. $\theta = 0.5$ and $\theta = 0.25$. For $\theta = 0.5$ point estimates from both weighting schemes indicate more inequality in France. The result, however, reverts for $\theta = 0.25$. At the same time, the between (within) component explains a larger fraction of total inequality in Sweden (France). In case of size (needs) weighting and $\theta = 0.5$, it makes up 18.49 percent (18.57 percent) of overall inequality in Sweden as opposed to 7.20 percent (6.73 percent) in France. For $\theta = 0.25$, the between-group component in Sweden explains 32.47 percent (34.11 percent) of total inequality for size (needs) weighting while the respective number for France is 11.93 percent (14.17).

These patterns in combination with the further disaggregated statistics in Table 5 make the effects of weighting schemes on country rankings intelligible. Particularly, Table 5 provides the determinants of the mean logarithmic deviation and its within and between component decomposed by the nine household types.

[Table 5 about here]

Altogether, Table 5 consists of three panels. The first panel contains household-type specific measures that are invariable to equivalence scale elasticity, i.e. household sizes, size-weighted population shares and household types' mean logarithmic deviations. Comparing the two countries, there are two obvious dissimilarities. First, in Sweden the population share of childless single adults is particularly high (25.68 percent in Sweden vs. 14.21 percent in France). Second, household-type specific mean logarithmic deviations are always higher in France compared to Sweden, while the quantitative variation in subgroup indices is more pronounced for Sweden. Again, Swedish childless single adults again stick out with a subgroup index far above the other household types' indices.

The second (third) panel of Table 5 gives household-type specific equivalence scales, needs weighted population shares and mean equivalent incomes relative to the population-wide means when $\theta = 0.5$ ($\theta = 0.25$). The latter statistic reveals another remarkable difference between France and Sweden. It concerns the economic situation of childless single adults: Average equivalent income of childless single adults falls far below the Swedish average. For France, the gap is substantially smaller. Both effects combined it is not surprising that, compared with size weighting, a higher population share of childless single adults in case of needs weighting (particularly at high levels of household-size economies) has other implications for the within- and between-group component in Sweden compared to France: In Sweden, both effects have a quantitatively stronger positive effect on measured inequality when switching from size to needs weighting. As a result, size and needs weighting lead to (in)consistent findings when household-size economies are low (high).

6 Conclusion

There is broad consensus regarding the adjustment of household incomes via equivalence scales in order to control for household economies when research involves the distribution of income and living standards in a society. On the contrary, the modus operandi concerning the weighting of household units is open to debate. When a population of differently-sized households is transformed into an artificial equivalent population, two alternative conversion schemes have been advocated: a weighting by household size and by needs.

We have provided cross-country personal-income inequality rankings derived from size- and needs-weighted distributions. Our examination revealed that cross-country inequality rankings are sensitive to weighting for reasonable levels of within-household size economies. For example, when the square-root equivalence scale is applied, Kendall's rank correlation of size and needs weighted country rankings based on the Theil index is 0.905. Performing a two-country inequality decomposition case study we isolated the channels that lead to differences in size and needs weighted country inequality rankings. The identification of these channels turned out to be a complex yet doable task.

Finally, we want to point out that beyond cross-country inequality rankings it may well be that also country welfare (mean equivalent income) or poverty rankings, as well as the assessment of the distributional effects of tax-transfer systems, are sensitive to the choice between the two weighting-types we have studied here.

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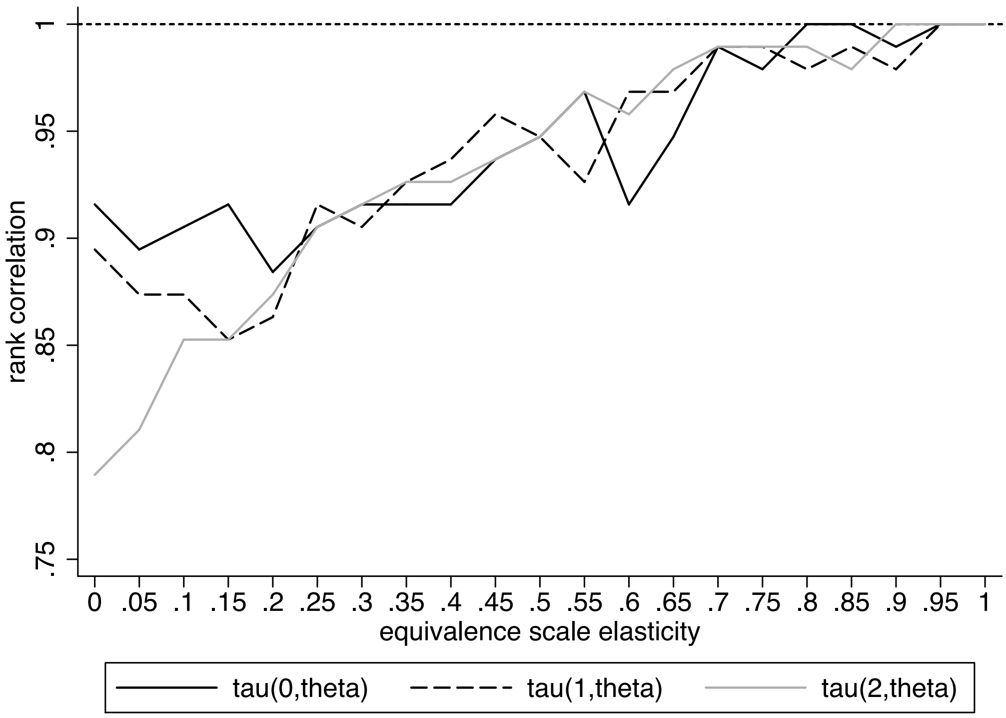
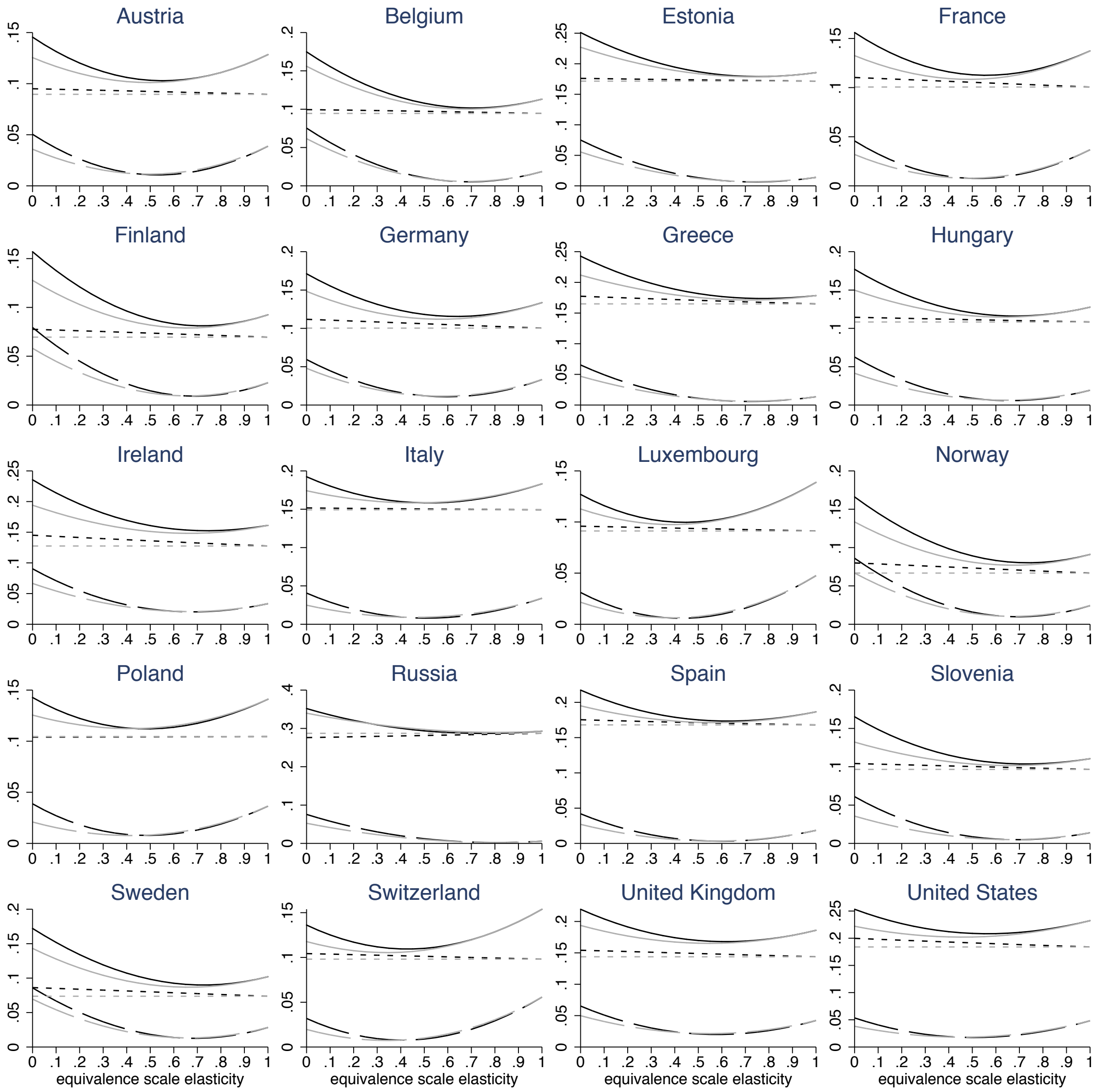
Figure 1. Kendall's tau



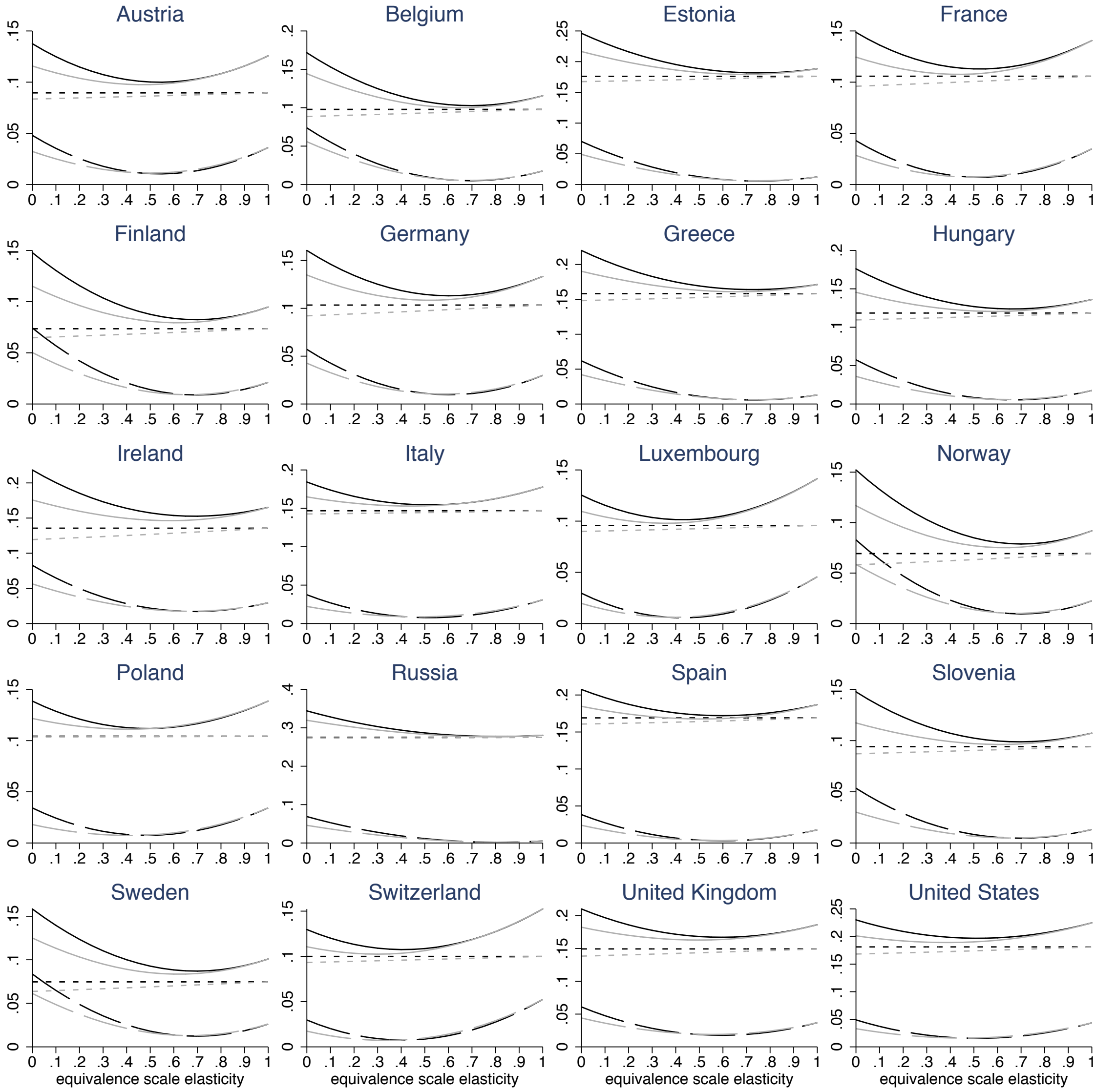
Note. Kendall's tau rank correlations of country rankings derived from size- and needs weighted distributions. Black solid line refers to mean logarithmic deviation; black dashed line to Theil index; grey solid line to half the square of the coefficient of variation Own calculations based on LIS 2000 data.

Figure 2a. Decomposition of mean logarithmic deviation



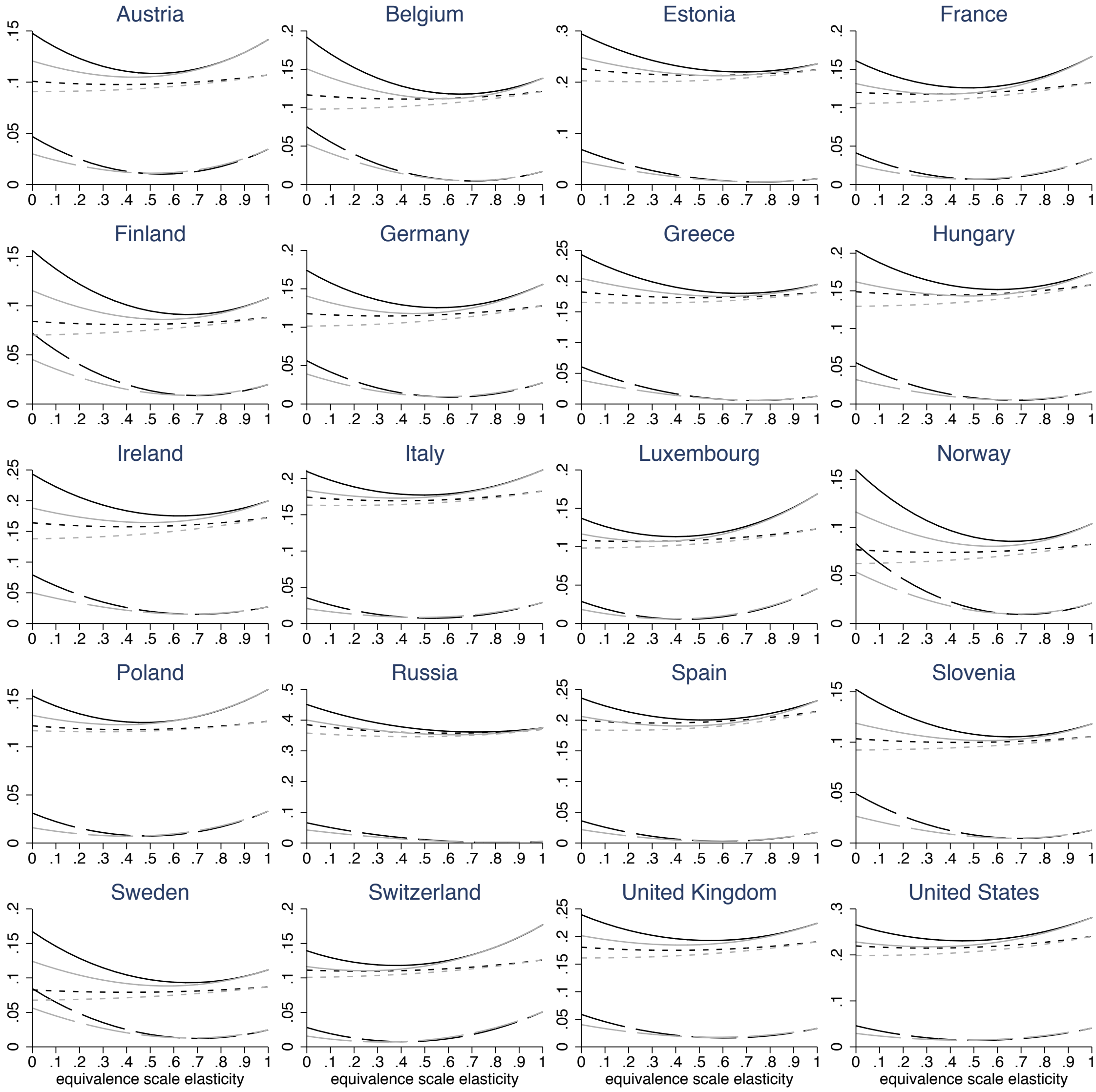
Note. Grey lines refer to size weighting, black lines to needs weighting. Solid lines indicate mean logarithmic deviation; short dashed lines the within-group inequality component; long dashed lines the between-group inequality component. Own calculations based on LIS 2000 data.

Figure 2b. Decomposition of Theil index



Note. Grey lines refer to size weighting, black lines to needs weighting. Solid lines indicate Theil index; short dashed lines the within-group inequality component; long dashed lines the between-group inequality component. Own calculations based on LIS 2000 data.

Figure 2c. Decomposition of half the square of the coefficient of variation



Note. Grey lines refer to size weighting, black lines to needs weighting. Solid lines indicate half the square of the coefficient of variation; short dashed lines the within-group inequality component; long dashed lines the between-group inequality component. Own calculations based on LIS 2000 data.

Table 1a. Size and needs weighted inequality estimates; equivalence-scale elasticity of 0.5

Country Code	GE(0)		GE(1)		GE(2)	
	S	N	S	N	S	N
AT	10.11 *(9.39;10.68)*	10.32 *(9.65;10.81)*	9.76 *(9.13;10.32)*	10.01 *(9.36;10.55)*	10.53 *(9.72;11.31)*	10.85 *(9.97;11.63)*
BE	10.44 *(9.77;11.18)*	10.78 *(10.00;11.49)*	10.27 *(9.53;11.03)*	10.81 *(9.89;11.55)*	11.26 *(10.23;12.20)*	12.15 *(10.85;13.19)*
EE	18.37 *(17.57;19.18)*	18.69 *(17.97;19.46)*	18.24 *(17.27;19.02)*	18.86 *(17.87;19.68)*	21.34 *(20.12;22.42)*	22.49 *(21.14;23.72)*
FR	10.84 *(10.54;11.16)*	11.30 *(10.98;11.60)*	10.80 *(10.50;11.10)*	11.30 *(10.95;11.66)*	11.95 *(11.54;12.28)*	12.59 *(12.10;13.02)*
FI	8.19 *(7.91;8.47)*	8.83 *(8.53;9.13)*	8.08 *(7.78;8.35)*	8.76 *(8.46;9.07)*	8.65 *(8.28;8.96)*	9.47 *(9.07;9.86)*
DE	11.25 *(10.73;11.69)*	11.82 *(11.21;12.20)*	10.85 *(10.25;11.26)*	11.46 *(10.82;11.82)*	11.81 *(11.00;12.30)*	12.60 *(11.66;13.08)*
GR	17.53 *(16.52;18.54)*	18.17 *(17.10;19.10)*	16.29 *(15.35;17.26)*	16.92 *(15.96;17.78)*	17.62 *(16.47;18.79)*	18.41 *(17.23;19.50)*
HU	11.64 *(10.69;12.73)*	12.02 *(11.02;13.15)*	12.12 *(10.99;13.28)*	12.69 *(11.50;13.85)*	14.33 *(12.70;15.67)*	15.32 *(13.61;17.00)*
IE	15.13 *(13.57;16.38)*	16.08 *(14.46;17.11)*	14.70 *(13.02;16.07)*	15.74 *(14.13;17.01)*	16.44 *(14.23;18.17)*	17.76 *(15.51;19.39)*
IT	15.84 *(14.81;16.82)*	15.83 *(14.93;16.74)*	15.32 *(14.41;16.17)*	15.45 *(14.51;16.25)*	17.40 *(16.14;18.50)*	17.72 *(16.38;18.88)*
LU	9.88 *(9.27;10.54)*	10.01 *(9.41;10.71)*	9.99 *(9.34;10.66)*	10.20 *(9.46;10.98)*	11.08 *(10.14;11.99)*	11.46 *(10.31;12.51)*
NO	8.09 *(7.86;8.39)*	8.92 *(8.67;9.24)*	7.71 *(7.50;8.00)*	8.49 *(8.25;8.80)*	8.11 *(7.84;8.48)*	8.99 *(8.62;9.39)*
PL	11.28 *(11.07;11.54)*	11.21 *(11.01;11.44)*	11.17 *(10.94;11.44)*	11.19 *(10.95;11.45)*	12.42 *(12.09;12.77)*	12.54 *(12.20;12.88)*
RU	29.73 *(27.48;31.34)*	29.37 *(27.46;30.92)*	28.31 *(25.79;29.93)*	28.68 *(26.54;30.24)*	35.49 *(31.43;38.35)*	36.93 *(33.13;39.73)*
ES	17.17 *(16.12;17.85)*	17.52 *(16.47;18.23)*	16.76 *(15.77;17.49)*	17.30 *(16.25;18.00)*	19.10 *(17.66;20.13)*	20.03 *(18.14;21.24)*
SI	10.35 *(9.70;11.11)*	10.91 *(10.20;11.67)*	9.71 *(9.14;10.34)*	10.24 *(9.67;10.86)*	10.17 *(9.57;10.88)*	10.78 *(10.12;11.58)*
SE	9.04 *(8.80;9.31)*	9.84 *(9.55;10.11)*	8.52 *(8.30;8.76)*	9.27 *(9.04;9.53)*	8.89 *(8.65;9.17)*	9.74 *(9.49;10.05)*
CH	10.82 *(10.26;11.41)*	11.02 *(10.44;11.58)*	10.63 *(10.09;11.21)*	10.86 *(10.21;11.39)*	11.71 *(10.86;12.47)*	12.02 *(11.11;12.73)*
UK	16.54 *(16.23;16.84)*	16.97 *(16.66;17.28)*	16.29 *(15.97;16.60)*	16.82 *(16.45;17.12)*	18.52 *(18.04;18.92)*	19.31 *(18.78;19.70)*
US	20.22 *(19.87;20.60)*	20.88 *(20.53;21.28)*	19.03 *(18.60;19.44)*	19.69 *(19.26;20.14)*	22.18 *(21.44;22.73)*	23.11 *(22.38;23.79)*

Note. S indicates size weighting, N needs weighting. GE(0) is mean logarithmic deviation; GE(1) is Theil index; GE(2) is half the square of the coefficient of variation. Point estimates and, in parentheses and italics, 95 percent bootstrap confidence intervals. All indices multiplied with 100. See Table A1 in the Appendix for definition of country codes. Own calculations based on LIS 2000 data.

Table 1b. Size and needs weighted inequality estimates; equivalence-scale elasticity of 0.25

Country Code	GE(0)		GE(1)		GE(2)	
	S	N	S	N	S	N
AT	10.72 *(10.05;11.22)*	11.56 *(10.95;12.02)*	10.17 *(9.55;10.69)*	11.08 *(10.48;11.59)*	10.78 *(10.04;11.45)*	11.89 *(11.14;12.61)*
BE	12.33 *(11.64;13.08)*	13.23 *(12.31;13.97)*	11.78 *(11.12;12.61)*	13.09 *(12.22;13.84)*	12.52 *(11.58;13.56)*	14.50 *(13.44;15.57)*
EE	20.02 *(19.07;20.79)*	21.08 *(20.27;21.85)*	19.53 *(18.67;20.32)*	21.00 *(20.04;21.89)*	22.50 *(21.30;23.64)*	24.89 *(23.50;26.15)*
FR	11.42 *(11.14;11.79)*	12.57 *(12.24;12.90)*	11.08 *(10.79;11.38)*	12.26 *(11.93;12.52)*	11.94 *(11.59;12.32)*	13.39 *(12.94;13.76)*
FI	9.81 *(9.49;10.15)*	11.38 *(11.00;11.76)*	9.25 *(8.95;9.55)*	10.93 *(10.58;11.29)*	9.54 *(9.20;9.88)*	11.56 *(11.16;12.00)*
DE	12.36 *(11.80;12.77)*	13.64 *(12.96;14.06)*	11.59 *(11.02;11.93)*	12.95 *(12.19;13.33)*	12.27 *(11.51;12.72)*	14.00 *(12.98;14.42)*
GR	18.91 *(17.83;19.88)*	20.42 *(19.17;21.37)*	17.31 *(16.25;18.31)*	18.76 *(17.62;19.71)*	18.63 *(17.24;19.89)*	20.44 *(18.80;21.66)*
HU	12.80 *(11.91;13.93)*	14.00 *(12.96;15.09)*	12.93 *(11.87;14.08)*	14.38 *(13.13;15.44)*	14.80 *(13.29;16.22)*	16.90 *(15.11;18.35)*
IE	16.67 *(15.00;18.04)*	18.81 *(17.04;19.99)*	15.66 *(13.92;17.24)*	17.89 *(15.95;19.15)*	17.05 *(14.72;18.93)*	19.88 *(16.97;21.87)*
IT	16.16 *(15.04;17.00)*	16.71 *(15.79;17.49)*	15.53 *(14.64;16.32)*	16.24 *(15.32;17.00)*	17.45 *(16.19;18.47)*	18.50 *(17.00;19.57)*
LU	9.95 *(9.38;10.63)*	10.48 *(9.89;11.23)*	9.91 *(9.29;10.55)*	10.56 *(9.92;11.38)*	10.73 *(9.97;11.46)*	11.64 *(10.71;12.68)*
NO	9.98 *(9.73;10.30)*	11.82 *(11.46;12.13)*	9.10 *(8.86;9.39)*	10.93 *(10.60;11.29)*	9.25 *(8.97;9.61)*	11.36 *(10.94;11.81)*
PL	11.45 *(11.21;11.69)*	11.90 *(11.69;12.15)*	11.28 *(11.04;11.53)*	11.81 *(11.59;12.06)*	12.43 *(12.10;12.74)*	13.14 *(12.83;13.43)*
RU	31.42 *(29.22;33.08)*	31.48 *(29.41;32.95)*	29.79 *(27.40;31.40)*	30.87 *(28.65;32.50)*	37.13 *(33.18;39.70)*	39.84 *(36.01;42.50)*
ES	17.90 *(16.88;18.65)*	18.88 *(17.93;19.65)*	17.23 *(16.26;17.93)*	18.38 *(17.37;19.13)*	19.32 *(17.95;20.29)*	20.95 *(19.34;22.12)*
SI	11.38 *(10.72;12.26)*	12.89 *(12.27;13.85)*	10.41 *(9.87;11.18)*	11.83 *(11.22;12.61)*	10.72 *(10.15;11.55)*	12.28 *(11.56;13.20)*
SE	10.91 *(10.60;11.18)*	12.64 *(12.27;12.98)*	9.89 *(9.61;10.12)*	11.66 *(11.35;11.92)*	10.01 *(9.73;10.27)*	12.11 *(11.81;12.42)*
CH	10.64 *(10.12;11.22)*	11.41 *(10.84;11.96)*	10.27 *(9.71;10.84)*	11.09 *(10.47;11.61)*	11.04 *(10.42;11.76)*	12.04 *(11.26;12.75)*
UK	17.38 *(17.13;17.68)*	18.61 *(18.33;18.93)*	16.79 *(16.47;17.09)*	18.15 *(17.84;18.46)*	18.75 *(18.28;19.14)*	20.63 *(20.14;21.03)*
US	20.63 *(20.30;20.99)*	22.21 *(21.82;22.61)*	19.07 *(18.66;19.39)*	20.56 *(20.16;21.01)*	21.81 *(21.08;22.31)*	23.76 *(23.03;24.35)*

Note. S indicates size weighting, N needs weighting. GE(0) is mean logarithmic deviation; GE(1) is Theil index; GE(2) is half the square of the coefficient of variation. Point estimates and, in parentheses and italics, 95 percent bootstrap confidence intervals. All indices multiplied with 100. See Table A1 in the Appendix for definition of country codes. Own calculations based on LIS 2000 data.

Table 2a. Sensitivity of bilateral inequality rankings, equivalence scale elasticity of 0.5

	AT	BE	EE	FR	FI	DE	GR	HU	IE	IT	LU	NO	PL	RU	ES	SI	SE	CH	UK
BE	.																		
EE	.	.																	
FR	100	.	.																
FI	.	.	.	.															
DE	011	.	.	.	.														
GR	.	.	.	.	.	.													
HU	.	.	.	.	.	.	.												
IE	.	.	.	.	.	.	100	010											
IT	.	.	.	.	.	.	100	001	.										
LU	.	.	.	100	.	.	.	.	.	.									
NO	.	.	.	.	.	.	.	.	.	.	.								
PL	.	.	.	.	.	.	.	011	.	.	011	.							
RU	.	.	.	.	.	.	.	.	.	.	.	.	.						
ES	.	.	.	.	.	.	.	.	.	010	.	.	.	.					
SI	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.				
SE	111	100	.	.	.	.	.	.	.	.	010	.	.	.	.	.			
CH	.	.	.	.	.	.	.	010	.	.	.	.	.	.	.	.	.		
UK	.	.	.	.	.	.	.	.	.	010	.	.	.	.	.	.	.	.	
US	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Note. "1" ("0") denotes that bilateral ranking is sensitive (insensitive) to weighting procedure. "." indicates that size and needs weighting give consistent results for all three indices. First entry in numerical sequences refers to GE(0), second to GE(1), and third to GE(2). All indices multiplied with 100. See Table A1 in the Appendix for definition of country codes. Own calculations based on LIS 2000 data.

Table 2b. Sensitivity of bilateral inequality rankings, equivalence scale elasticity of 0.25

	AT	BE	EE	FR	FI	DE	GR	HU	IE	IT	LU	NO	PL	RU	ES	SI	SE	CH	UK
BE	.																		
EE	.	.																	
FR	100	.	.																
FI	011	.	.	.															
DE	.	.	.	.	.														
GR	.	.	.	.	.	.													
HU	.	.	.	.	.	.	.												
IE	.	.	.	.	.	.	.	010											
IT	.	.	.	.	.	.	010	010	.										
LU	.	.	.	.	001	.	.	.	.	.									
NO	011	.	.	.	.	.	.	.	.	.	101								
PL	010	111	.	100	100	010	.	.	.	.	.	100							
RU	.	.	.	.	.	.	.	.	.	.	.	.	.						
ES	.	.	.	.	.	.	.	.	.	110	.	.	.	.					
SI	100	.	.	001	011	.	.	.	.	.	.	011	101	.	.				
SE	100	100	.	.	.	100	.	100	.	.	100	001	110	.		.			
CH	.	001	.	111	011	001	.	.	.	.	.	011	010	.	.	100	101		
UK	.	.	.	.	.	.	.	.	.	001	.	.	.	.	.	.	.	.	
US	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Note. "1" ("0") denotes that bilateral ranking is sensitive (insensitive) to weighting procedure. "." indicates that size and needs weighting give consistent results for all three indices. First entry in numerical sequences refers to GE(0), second to GE(1), and third to GE(2). All indices multiplied with 100. See Table A1 in the Appendix for definition of country codes. Own calculations based on LIS 2000 data.

Table 3. Kendall's tau and number of discordant pairs

	$\theta = 0.50$			$\theta = 0.25$		
	GE(0)	GE(1)	GE(2)	GE(0)	GE(1)	GE(2)
Kendall's τ (bootstrapped)	93.68	90.53	94.74	81.05	83.16	81.05
Kendall's τ (point estimate)	94.74	94.74	94.74	90.53	91.58	92.63
Significantly discordant pairs (bootstrapped)	6	9	5	18	16	18

Note. GE(0) is mean logarithmic deviation; GE(1) is Theil index; GE(2) is half the square of the coefficient of variation. θ denotes the equivalence-scale elasticity. Kendall's tau multiplied with 100. Own calculations based on LIS 2000 data.

Table 4. Inequality indices for France and Sweden

	State	$\theta = 0.50$		$\theta = 0.25$	
		S	N	S	N
GE(0)	FR	10.84	11.30	11.42	12.57
	SE	9.04	9.84	10.91	12.64
GEB(0)	FR	0.78	0.76	1.36	1.78
		(7.20)	(6.73)	(11.93)	(14.17)
	SE	1.67	1.83	3.54	4.31
		(18.49)	(18.57)	(32.47)	(34.11)
GEW(0)	FR	10.06	10.54	10.06	10.79
		(92.80)	93.27)	(88.07)	(85.83)
	SE	7.37	(8.01	7.37	8.33
		(81.51)	(81.43)	(67.53)	(65.89)

Note. GE(0) is mean logarithmic deviation; GEB(0) is between group inequality; GEW(0) is within group inequality. θ denotes the equivalence-scale elasticity. In parentheses: Contribution in percent to total inequality. All indices multiplied with 100. Own calculations based on LIS 2000 data.

Table 5. Detailed decomposition results for France and Sweden

	State	1 adult, childless	1 adults, 1 child	1adult, 2 children	1 adult, 3 children	2 adults, childless	2 adults, 1 child	2 adults, 2 children	2 adults, 3 children	3 adults, childless
						Scale-independent statistics				
n		1	2	3	4	2	3	4	5	3
q_k^S	FR	14.21	2.10	1.85	0.64	30.26	13.32	19.39	9.25	8.98
	SE	25.68	3.11	2.95	1.13	27.59	9.62	17.49	7.32	5.10
$GE_k(0)$	FR	13.08	11.16	9.22	9.23	11.71	8.84	8.25	6.80	8.72
	SE	10.67	6.94	4.59	3.81	8.15	5.97	4.86	4.19	4.85
						$\theta = 0.5$				
$n^{0.5}$		1.41	1.73	2.00	1.41	1.73	2.00	2.24	1.73	1.41
q_k^N	FR	21.81	2.28	1.64	0.49	32.83	11.80	14.87	6.34	7.95
	SE	36.59	3.13	2.43	0.80	27.80	7.92	12.46	4.67	4.20
μ_k^S / μ^S	FR	86.56	68.32	59.90	59.33	108.87	102.46	96.73	92.84	120.72
	SE	75.14	72.35	70.03	66.06	115.96	108.79	109.36	98.89	133.50
μ_k^N / μ^N	FR	87.09	68.73	60.26	59.69	109.52	103.08	97.31	93.40	121.45
	SE	77.71	74.83	72.43	68.32	119.93	112.52	113.11	102.28	138.08
						$\theta = 0.25$				
$n^{0.25}$		1.19	1.32	1.41	1.19	1.32	1.41	1.50	1.32	1.19
q_k^N	FR	26.37	2.31	1.50	0.42	33.39	10.84	12.72	5.13	7.31
	SE	42.47	3.06	2.14	0.66	27.13	6.98	10.23	3.62	3.70
μ_k^S / μ^S	FR	68.28	64.09	62.18	66.18	102.12	106.37	107.91	109.51	125.33
	SE	44.99	51.52	55.18	55.94	82.57	85.73	92.60	88.54	105.20
μ_k^N / μ^N	FR	72.00	67.58	65.57	69.79	107.68	112.16	113.78	115.47	132.15
	SE	66.95	76.67	82.12	83.24	122.88	127.58	137.81	131.77	156.56

Note. n denotes household size; q_k^t is the fraction of the population living in type k households according to weighting scheme t. μ_k^t is mean equivalent income of type k household according to weighting scheme t; μ^t is mean equivalent income according to t. $GE_k(0)$ is mean logarithmic deviation in subgroup k. θ denotes the equivalence-scale elasticity; In parentheses and in italics: Fraction of total inequality. All indices multiplied with 100. Own calculations based on LIS 2000 data.

Appendix

Table A1. Country-specific sample characteristics

State Code	State	*Average income*	*N*	*Coverage*
AT	Austria	34,159	1,792	79.20
BE	Belgium	105,818	1,937	87.39
EE	Estonia	5,710	4,880	78.09
FR	France	15,411	9,338	83.63
FI	Finland	13,908	9,406	88.78
DE	Germany	4,880	10,037	87.00
GR	Greece	430,244	2,977	69.80
HU	Hungary	84,873	1,570	73.13
IE	Ireland	2,001	1,851	68.43
IT	Italy	3,576	6,334	71.30
LU	Luxembourg	157,838	2,174	81.62
NO	Norway	29,093	11,279	87.57
PL	Poland	1,728	24,039	63.61
RU	Russia	3,235	2,465	66.15
ES	Spain	283,709	3,627	65.23
SI	Slovenia	195,632	2,565	61.01
SE	Sweden	21,846	13,449	90.16
CH	Switzerland	6,456	3,358	86.37
UK	United Kingdom	1,764	23,210	83.66
US	United States	3,984	43,711	78.63

Note. Average income is monthly disposable household income per individual denoted in local currency. *N* gives the non-weighted size of the country-specific working samples. Coverage gives the weighted fraction of the initial LIS dataset living in the considered nine household types. Own calculations based on LIS 2000 data.

Table A2. Country-specific sample characteristics by household type

State		1 adult, childless	1 adults, 1 child	1adult, 2 children	1 adult, 3 children	2 adults, childless	2 adults, 1 child	2 adults, 2 children	2 adults, 3 children	3 adults, childless
	N	502	42	23	2	608	153	213	60	189
AT	*Pop. share*	16.46	2.78	1.61	0.17	29.15	14.24	19.64	4.97	10.97
	Av. income	18,508	20,240	23,505	21,138	34,039	38,043	39,169	40,593	46,325
	N	603	35	25	7	636	174	265	96	96
BE	*Pop. share*	17.46	2.05	1.80	0.88	29.53	10.45	22.39	9.22	6.22
	Av. income	48,121	56,425	69,231	68,810	104,914	120,736	129,154	145,420	136,386
	N	1,102	166	69	21	1,650	610	523	139	600
EE	*Pop. share*	14.74	3.59	1.50	0.57	28.94	17.72	16.27	4.16	12.52
	Av. income	2,526	3,599	3,559	3,011	5,087	6,911	7,789	7,577	6,857
	N	2,640	219	125	35	3,278	879	1,086	417	659
FR	*Pop. share*	14.21	2.10	1.85	0.64	30.26	13.32	19.39	9.25	8.98
	Av. income	8198	9,150	9,825	11,237	14,581	16,807	18,322	19,660	19,803
	N	2,047	157	89	26	3,523	1,032	1,219	531	782
FI	*Pop. share*	19.84	2.45	1.80	0.77	32.45	11.16	16.12	8.43	6.98
	Av. income	6,456	8,905	10,280	11,969	13,710	16,379	18,293	19,124	18,527
	N	3,016	220	104	21	3,573	1,029	1,082	304	688
DE	*Pop. share*	22.52	2.29	1.32	0.28	33.01	12.36	15.18	4.82	8.22
	Av. income	2,653	2,553	2,489	3,050	5,097	5,667	6,315	6,252	6,560
	N	595	16	14	1	1,063	290	441	70	487
GR	*Pop. share*	10.29	0.51	0.65	0.04	27.58	11.26	25.55	4.32	19.80
	Av. income	201,218	289,840	280,318	931,000	315,507	521,603	547,652	462,454	506,243
	N	393	22	7	2	556	154	176	40	220
HU	*Pop. share*	14.22	1.23	0.44	0.19	29.80	12.67	18.01	4.79	18.66
	Av. income	41,458	43,222	70,985	45,458	73,925	105,998	106,929	101,826	98,928
	N	480	37	25	8	565	156	242	163	175
IE	*Pop. share*	12.69	3.26	2.37	1.52	22.65	11.33	22.11	14.53	9.54
	Av. income	947	835	945	872	1,693	2,278	2,428	2,826	2,401
	N	1,454	53	19	6	2,157	667	759	141	1,078
IT	*Pop. share*	10.82	0.80	0.38	0.26	28.60	14.96	19.64	4.63	19.91
	Av. income	1,892	2,658	2,477	2,333	3,310	3,842	3,761	3,703	4,536
	N	583	30	13	2	735	270	255	96	190
LU	*Pop. share*	13.84	1.07	0.88	0.09	30.05	14.83	19.90	9.21	10.13
	Av. income	95,810	95,666	98,877	55,288	151,196	160,864	180,182	182,251	204,341
	N	2,811	299	128	32	3,670	1,114	1,514	703	1,008
NO	*Pop. share*	21.93	3.66	2.40	0.70	26.65	10.23	17.88	9.67	6.87
	Av. income	13,224	19,286	20,611	23,185	28,476	34,217	38,221	41,831	41,592
	N	4,311	547	300	114	7,267	3,441	3,754	1,370	2,935
PL	*Pop. share*	7.11	1.73	1.35	0.69	23.72	16.65	23.82	10.68	14.24
	Av. income	850	1,196	1,240	1,212	1,567	1,856	1,935	1,817	2,005
	N	611	122	29	2	775	417	235	30	244
RU	*Pop. share*	10.65	4.25	1.52	0.16	27.01	21.80	19.31	2.54	12.76
	Av. income	1,291	2,491	2,166	1,128	2,741	3,914	4,010	5,795	3,462
	N	716	22	11	3	1,337	462	474	80	522
ES	*Pop. share*	8.94	0.46	0.47	0.16	30.30	15.66	21.29	4.62	18.12
	Av. income	133,700	156,883	179,362	268,475	242,902	303,652	336,284	371,434	330,616
	N	365	29	11	0	844	304	389	57	566
SI	*Pop. share*	8.59	1.17	0.69	0.00	24.55	14.37	25.45	4.16	21.02
	Av. income	81,139	116,026	127,828	0	158,345	207,803	233,124	218,648	234,378
	N	4,694	237	150	43	4,772	978	1,332	446	797
SE	*Pop. share*	25.68	3.11	2.95	1.13	27.59	9.62	17.49	7.32	5.10
	Av. income	10,444	14,222	16,859	18,363	22,794	26,192	30,401	30,736	32,141
	N	895	45	40	9	1,192	307	509	172	189
CH	*Pop. share*	15.67	0.89	1.23	0.31	33.35	10.66	20.86	8.19	8.85
	Av. income	4,013	4,290	4,684	4,477	6,776	6,762	6,938	7,267	7,852
	N	7,179	805	659	268	8,036	1,853	2,354	802	1,254
UK	*Pop. share*	14.41	2.70	3.23	1.79	33.18	10.20	17.06	7.29	10.14
	Av. income	897	882	952	966	1,719	1,965	2,279	2,146	2,434
	N	12,442	1,337	914	348	14,902	4,231	4,758	1,929	2,850
US	*Pop. share*	12.95	2.77	2.86	1.43	30.40	12.97	19.06	9.09	8.49
	Av. income	2,029	2,117	2,266	1,886	3,995	4,511	4,870	4,672	4,935

Note. *N* denotes non weighted number of observation. "Pop. share" is the fraction of working sample living in a household type (weighted by LIS frequency weights; in percent). "Av. income" denotes mean disposable income (weighted by LIS frequency weights). See Table A1 for country code definitions. Own calculations based on LIS 2000 data.

Table A3a. Subgroup specific mean logarithmic deviations

State	1 adult, childless	1 adults, 1 child	1adult, 2 children	1 adult, 3 children	2 adults, childless	2 adults, 1 child	2 adults, 2 children	2 adults, 3 children	3 adults, childless
AT	10.23	5.95	9.12	2.10	11.01	6.73	7.49	7.98	8.36
	(9.11;11.22)	*(3.03;7.56)*	*(1.96;12.72)*	*(0.58;3.02)*	*(9.96;11.87)*	*(5.63;8.05)*	*(5.70;9.00)*	*(4.33;10.64)*	*(6.92;9.48)*
BE	9.83	5.24	9.31	4.29	12.48	7.13	9.04	5.85	6.71
	(7.19;11.79)	*(2.08;7.61)*	*(3.25;14.72)*	*(-2.73;8.70)*	*(11.11;13.77)*	*(4.82;9.08)*	*(6.97;11.18)*	*(3.10;7.64)*	*(3.95;8.42)*
EE	19.34	18.32	11.00	10.49	16.84	16.74	18.02	15.09	16.21
	(16.12;22.50)	*(9.65;23.57)*	*(6.08;14.79)*	*(3.57;16.48)*	*(15.50;18.42)*	*(14.63;18.41)*	*(15.08;19.92)*	*(11.51;18.35)*	*(14.11;18.28)*
FR	13.08	11.16	9.22	9.23	11.71	8.84	8.25	6.80	8.72
	(12.09;13.88)	*(9.04;13.07)*	*(6.59;12.34)*	*(4.66;13.51)*	*(11.20;12.22)*	*(7.94;9.86)*	*(7.48;8.95)*	*(5.46;7.67)*	*(7.67;9.73)*
FI	9.07	6.44	4.51	3.95	8.22	6.04	4.80	4.53	5.59
	(8.30;9.76)	*(4.48;7.91)*	*(3.10;5.81)*	*(0.95;6.20)*	*(7.72;8.49)*	*(5.27;6.79)*	*(4.27;5.29)*	*(3.85;5.15)*	*(4.36;6.41)*
DE	13.54	8.95	14.75	2.93	10.58	8.49	7.27	7.75	6.91
	(12.12;14.67)	*(6.41;10.85)*	*(9.10;19.10)*	*(1.42;4.22)*	*(9.97;11.17)*	*(7.40;9.42)*	*(5.79;8.43)*	*(6.17;9.41)*	*(4.62;8.16)*
GR	22.01	26.00	23.30	0.00	18.65	16.09	15.01	12.09	13.53
	(19.58;24.72)	*(7.27;41.24)*	*(12.13;32.54)*	*(0.00;0.00)*	*(16.76;20.18)*	*(13.53;20.29)*	*(12.06;17.96)*	*(8.38;17.00)*	*(10.13;16.95)*
HU	13.04	12.95	4.61	4.56	11.38	14.21	10.28	5.51	8.12
	(9.67;16.22)	*(4.23;19.93)*	*(0.99;7.40)*	*(-1.77;2.80)*	*(10.04;13.14)*	*(9.56;16.12)*	*(6.37;13.44)*	*(1.74;9.36)*	*(5.05;11.05)*
IE	18.27	7.17	6.30	4.83	17.76	11.14	8.92	10.78	12.36
	(14.67;20.57)	*(3.95;9.49)*	*(2.62;8.47)*	*(-1.41;7.76)*	*(14.69;19.72)*	*(8.04;14.56)*	*(6.45;11.13)*	*(7.39;13.28)*	*(6.70;16.21)*
IT	16.27	11.42	14.41	12.88	15.30	13.90	14.59	16.51	14.60
	(14.32;18.15)	*(4.94;16.40)*	*(3.69;21.13)*	*(-4.21;21.16)*	*(14.00;16.43)*	*(11.66;15.88)*	*(12.66;16.75)*	*(9.22;21.00)*	*(12.77;16.17)*
LU	10.39	7.33	10.73	2.28	10.46	8.37	8.15	8.06	7.55
	(8.21;11.93)	*(3.68;8.83)*	*(2.80;16.23)*	*(-0.51;1.76)*	*(9.56;11.23)*	*(6.59;10.41)*	*(6.71;9.26)*	*(6.15;9.49)*	*(5.63;8.87)*
NO	10.51	7.13	5.89	3.00	7.41	4.81	4.54	3.91	4.25
	(9.86;11.19)	*(4.84;8.74)*	*(2.42;8.79)*	*(0.71;4.91)*	*(6.97;7.84)*	*(4.15;5.36)*	*(4.09;4.94)*	*(3.04;4.52)*	*(3.73;4.73)*
PL	10.60	12.80	10.18	9.76	9.71	11.54	10.54	10.96	9.72
	(10.07;11.25)	*(10.86;14.47)*	*(8.40;11.90)*	*(4.63;13.52)*	*(9.38;10.06)*	*(10.97;12.15)*	*(10.02;10.96)*	*(10.15;11.76)*	*(9.14;10.30)*
RU	26.17	38.58	36.70	0.00	22.88	34.58	32.98	39.42	20.88
	(20.15;30.92)	*(29.11;46.10)*	*(13.62;53.97)*	*(0.00;0.00)*	*(19.18;25.60)*	*(26.71;43.62)*	*(27.64;38.87)*	*(16.93;52.29)*	*(4.27;28.64)*
ES	21.64	13.77	23.39	23.93	17.79	13.70	17.32	19.17	14.06
	(18.33;24.63)	*(5.51;21.64)*	*(7.91;31.99)*	*(-5.09;22.65)*	*(16.59;19.14)*	*(9.26;16.02)*	*(15.04;20.04)*	*(13.98;23.47)*	*(9.41;16.18)*
SI	11.83	7.31	14.48	0.00	12.69	8.81	7.05	7.29	9.48
	(9.88;13.43)	*(2.33;9.98)*	*(-0.57;22.47)*	*(0.00;0.00)*	*(11.03;13.82)*	*(7.01;10.36)*	*(5.29;8.40)*	*(3.07;9.79)*	*(7.73;10.89)*
SE	10.67	6.94	4.59	3.81	8.15	5.97	4.86	4.19	4.85
	(10.15;11.19)	*(4.87;8.64)*	*(2.87;6.32)*	*(0.32;6.86)*	*(7.81;8.52)*	*(5.23;6.53)*	*(4.25;5.27)*	*(3.56;4.86)*	*(4.07;5.35)*
CH	11.41	5.51	10.26	5.15	11.32	7.01	6.95	10.29	11.59
	(9.78;12.56)	*(3.53;7.30)*	*(6.22;13.65)*	*(1.40;7.48)*	*(10.37;12.16)*	*(5.88;8.05)*	*(6.02;8.03)*	*(6.52;13.07)*	*(8.65;13.83)*
UK	17.62	10.15	9.08	6.04	16.75	13.41	12.49	12.13	12.14
	(16.90;18.27)	*(8.86;11.33)*	*(7.48;10.15)*	*(4.29;7.36)*	*(16.29;17.16)*	*(12.58;14.40)*	*(11.76;13.14)*	*(11.08;13.10)*	*(11.23;13.02)*
US	24.87	18.59	21.83	21.12	19.67	16.64	15.06	15.69	15.41
	(24.06;25.82)	*(17.27;20.39)*	*(18.33;25.24)*	*(16.98;26.11)*	*(19.00;20.19)*	*(15.75;17.57)*	*(14.19;15.68)*	*(14.54;16.89)*	*(14.48;16.26)*

Note. Point estimates and, in parentheses and italics, 95 percent bootstrap confidence intervals. All indices multiplied with 100. See Table A1 in the Appendix for definition of country codes. Own calculations based on LIS 2000 data.

Table A3b. Subgroup specific Theil indices

State	1 adult, childless	1 adults, 1 child	1adult, 2 children	1 adult, 3 children	2 adults, childless	2 adults, 1 child	2 adults, 2 children	2 adults, 3 children	3 adults, childless
AT	10.49	5.52	8.30	2.21	10.29	6.41	7.12	6.77	8.08
	(9.25;11.59)	*(2.64;7.07)*	*(1.81;11.14)*	*(0.69;3.14)*	*(9.38;11.13)*	*(5.35;7.55)*	*(5.71;8.20)*	*(4.09;8.85)*	*(6.64;9.11)*
BE	11.14	5.58	9.54	3.47	12.75	6.56	8.14	5.50	6.61
	(7.56;13.95)	*(2.30;8.14)*	*(2.42;15.00)*	*(-3.12;7.30)*	*(11.10;14.24)*	*(4.73;7.97)*	*(6.14;9.87)*	*(2.79;6.95)*	*(4.16;8.29)*
EE	22.32	19.46	11.46	9.68	17.99	15.34	16.45	14.61	15.32
	(17.92;25.74)	*(8.04;26.39)*	*(5.99;15.44)*	*(3.83;15.06)*	*(16.47;19.89)*	*(13.38;16.80)*	*(14.45;18.33)*	*(10.72;17.57)*	*(13.13;17.02)*
FR	13.83	11.62	9.91	10.10	11.62	8.58	8.16	6.76	8.20
	(12.71;14.80)	*(8.97;13.72)*	*(6.44;13.88)*	*(4.32;14.88)*	*(11.02;12.15)*	*(7.75;9.64)*	*(7.41;8.82)*	*(5.76;7.60)*	*(7.30;9.13)*
FI	9.79	6.30	4.50	4.38	8.25	5.66	4.61	4.41	5.27
	(8.98;10.75)	*(4.55;7.70)*	*(2.91;5.74)*	*(1.61;6.78)*	*(7.77;8.55)*	*(5.02;6.28)*	*(4.13;5.02)*	*(3.70;4.96)*	*(4.34;5.94)*
DE	13.96	8.55	13.92	2.70	10.22	8.30	7.13	7.29	6.51
	(12.02;15.40)	*(6.19;10.56)*	*(8.35;17.83)*	*(1.45;3.88)*	*(9.61;10.77)*	*(7.29;9.19)*	*(5.71;8.23)*	*(6.10;8.79)*	*(4.78;7.55)*
GR	21.08	22.11	21.28	0.00	18.38	14.96	13.82	11.64	12.26
	(18.79;24.04)	*(5.16;34.18)*	*(10.10;30.65)*	*(0.00;0.00)*	*(16.54;19.91)*	*(12.02;19.29)*	*(11.39;16.65)*	*(8.07;16.24)*	*(9.35;15.32)*
HU	16.08	14.16	4.72	4.51	12.33	14.27	9.83	5.49	8.10
	(12.04;20.67)	*(5.42;21.73)*	*(1.03;7.52)*	*(-1.74;2.77)*	*(10.89;14.38)*	*(9.70;16.05)*	*(6.04;13.20)*	*(2.03;9.19)*	*(5.16;10.99)*
IE	18.97	6.91	6.35	4.95	18.14	10.11	8.56	10.30	12.31
	(15.17;22.00)	*(3.63;9.16)*	*(2.32;8.64)*	*(-1.38;8.02)*	*(14.59;20.59)*	*(7.32;13.42)*	*(6.07;10.69)*	*(7.17;12.71)*	*(6.96;16.52)*
IT	17.27	11.85	14.68	11.64	15.45	13.08	13.78	16.11	13.29
	(14.86;19.53)	*(4.07;17.23)*	*(3.57;21.64)*	*(-5.30;18.23)*	*(13.80;16.77)*	*(10.82;14.97)*	*(12.05;15.42)*	*(10.40;20.03)*	*(11.46;14.69)*
LU	11.52	7.07	11.31	2.22	10.45	7.94	8.24	7.86	7.56
	(8.48;13.52)	*(4.12;8.58)*	*(2.73;16.61)*	*(-0.54;1.73)*	*(9.42;11.22)*	*(5.85;10.20)*	*(6.55;9.29)*	*(6.19;9.30)*	*(5.69;8.86)*
NO	10.48	7.03	5.19	2.68	7.30	4.67	4.46	3.82	4.10
	(9.53;11.36)	*(4.54;8.65)*	*(2.39;7.21)*	*(0.97;4.26)*	*(6.87;7.71)*	*(3.96;5.21)*	*(4.00;4.88)*	*(3.15;4.39)*	*(3.66;4.61)*
PL	12.05	13.46	10.23	11.13	9.80	11.18	10.30	10.83	9.38
	(11.33;12.90)	*(11.10;15.54)*	*(8.10;12.25)*	*(4.18;16.45)*	*(9.44;10.15)*	*(10.62;11.73)*	*(9.76;10.70)*	*(10.03;11.57)*	*(8.76;9.92)*
RU	33.75	36.98	32.76	0.00	23.84	30.53	28.68	34.18	18.23
	(25.60;39.92)	*(28.24;44.39)*	*(14.40;49.51)*	*(0.00;0.00)*	*(20.22;27.00)*	*(24.73;36.10)*	*(24.54;33.91)*	*(16.58;46.33)*	*(4.57;24.91)*
ES	24.99	14.69	22.06	20.92	17.78	13.05	16.45	18.93	13.13
	(20.11;28.69)	*(6.83;23.11)*	*(7.94;30.37)*	*(-6.29;21.74)*	*(16.42;19.23)*	*(7.60;15.14)*	*(14.28;19.38)*	*(14.58;22.37)*	*(7.93;15.11)*
SI	12.00	7.27	13.76	0.00	12.05	8.18	6.71	7.15	8.59
	(10.05;13.72)	*(2.73;9.83)*	*(-1.37;21.11)*	*(0.00;0.00)*	*(10.44;13.21)*	*(6.60;9.54)*	*(5.31;7.90)*	*(3.13;9.53)*	*(7.40;9.65)*
SE	10.38	6.77	4.55	4.28	7.79	5.52	4.56	4.11	4.41
	(9.75;10.90)	*(4.57;8.47)*	*(2.73;6.36)*	*(0.00;7.91)*	*(7.51;8.08)*	*(4.96;6.04)*	*(4.03;4.91)*	*(3.49;4.65)*	*(3.95;4.79)*
CH	11.82	5.59	10.20	4.97	10.73	6.93	6.83	9.40	10.55
	(10.13;13.34)	*(3.59;7.39)*	*(5.69;13.86)*	*(1.23;7.19)*	*(10.05;11.69)*	*(5.83;7.91)*	*(6.03;7.83)*	*(6.57;11.70)*	*(7.93;12.70)*
UK	19.07	11.29	10.30	6.60	16.39	12.58	11.96	12.10	11.43
	(18.19;19.87)	*(9.61;12.98)*	*(8.02;11.60)*	*(4.74;8.24)*	*(15.96;16.80)*	*(11.78;13.39)*	*(11.32;12.54)*	*(11.00;12.99)*	*(10.54;12.10)*
US	25.00	17.34	21.58	22.28	18.35	15.61	14.63	15.26	13.91
	(24.03;26.21)	*(15.87;18.83)*	*(17.89;25.36)*	*(16.75;28.26)*	*(17.70;18.96)*	*(14.73;16.56)*	*(13.69;15.31)*	*(14.03;16.61)*	*(12.96;14.49)*

Note. Point estimates and, in parentheses and italics, 95 percent bootstrap confidence intervals. All indices multiplied with 100. See Table A1 in the Appendix for definition of country codes. Own calculations based on LIS 2000 data.

Table A3c. Subgroup specific half the square of the coefficient of variation

State	1 adult, childless	1 adults, 1 child	1adult, 2 children	1 adult, 3 children	2 adults, childless	2 adults, 1 child	2 adults, 2 children	2 adults, 3 children	3 adults, childless
AT	12.04 *(10.09;13.57)*	5.52 *(2.70;7.33)*	8.79 *(1.72;12.44)*	2.35 *(0.81;3.31)*	10.81 *(9.86;11.91)*	6.52 *(5.40;7.70)*	7.40 *(6.00;8.36)*	6.42 *(4.19;8.25)*	8.49 *(6.83;9.71)*
BE	14.92 *(7.99;20.07)*	6.26 *(2.31;9.11)*	10.97 *(1.45;17.42)*	2.98 *(-3.06;6.49)*	14.55 *(12.26;16.63)*	6.62 *(4.83;8.07)*	8.13 *(6.37;9.80)*	5.53 *(2.59;7.19)*	6.95 *(4.04;9.10)*
EE	31.51 *(23.18;36.84)*	26.84 *(7.56;39.29)*	13.42 *(5.93;18.60)*	9.68 *(4.00;14.79)*	22.56 *(20.37;25.13)*	16.36 *(14.00;18.27)*	17.46 *(15.09;19.83)*	16.35 *(11.29;19.86)*	16.72 *(13.79;18.72)*
FR	16.77 *(15.07;18.27)*	13.62 *(9.25;16.48)*	11.89 *(7.32;17.86)*	12.18 *(4.34;18.50)*	12.82 *(11.95;13.48)*	9.08 *(8.19;10.32)*	8.73 *(7.73;9.44)*	7.19 *(5.98;8.08)*	8.37 *(7.46;9.35)*
FI	11.83 *(10.55;13.38)*	6.66 *(4.62;8.18)*	4.75 *(2.83;6.05)*	5.04 *(1.67;7.71)*	8.93 *(8.32;9.31)*	5.67 *(5.10;6.22)*	4.67 *(4.17;5.12)*	4.49 *(3.70;5.03)*	5.32 *(4.52;5.85)*
DE	16.94 *(13.84;19.39)*	8.99 *(5.81;11.47)*	14.87 *(7.69;19.64)*	2.54 *(1.46;3.64)*	10.94 *(10.16;11.54)*	8.79 *(7.50;9.85)*	7.63 *(5.95;8.82)*	7.50 *(5.93;9.04)*	6.70 *(5.28;7.79)*
GR	24.21 *(19.86;28.75)*	24.98 *(-3.18;40.18)*	21.53 *(7.17;32.89)*	0.00 *(0.00;0.00)*	21.25 *(18.71;23.48)*	15.93 *(11.14;21.61)*	14.61 *(12.15;17.88)*	12.52 *(8.49;18.27)*	12.71 *(9.16;16.14)*
HU	24.37 *(17.07;32.91)*	17.26 *(5.88;27.38)*	4.95 *(0.91;7.84)*	4.52 *(-1.86;2.79)*	15.18 *(12.74;18.09)*	16.13 *(10.81;19.09)*	10.35 *(5.45;14.59)*	5.75 *(1.61;9.62)*	8.79 *(5.48;12.10)*
IE	22.44 *(17.39;25.96)*	6.99 *(3.19;9.37)*	6.76 *(2.20;9.33)*	5.24 *(-1.57;8.57)*	21.32 *(16.52;24.95)*	10.17 *(7.01;13.56)*	9.14 *(6.11;11.84)*	11.04 *(7.31;14.10)*	13.86 *(7.85;18.86)*
IT	21.89 *(17.87;25.99)*	14.25 *(2.46;21.61)*	16.81 *(0.67;25.75)*	11.55 *(-5.31;17.54)*	18.29 *(15.56;20.42)*	14.25 *(10.60;16.56)*	15.15 *(12.95;17.36)*	18.29 *(11.76;22.81)*	13.97 *(11.09;15.47)*
LU	14.61 *(10.19;17.83)*	7.12 *(3.69;8.77)*	12.68 *(2.60;18.28)*	2.19 *(-0.63;1.72)*	11.32 *(10.27;12.25)*	8.07 *(5.47;10.80)*	8.87 *(6.93;10.09)*	8.17 *(6.58;9.99)*	8.04 *(6.00;9.37)*
NO	12.00 *(10.29;13.41)*	8.03 *(4.65;10.54)*	5.20 *(2.49;7.17)*	2.57 *(1.03;4.01)*	7.82 *(7.24;8.26)*	4.84 *(4.02;5.44)*	4.69 *(4.16;5.12)*	3.96 *(3.25;4.55)*	4.15 *(3.66;4.72)*
PL	15.82 *(14.37;17.38)*	16.43 *(12.08;19.82)*	11.64 *(8.19;14.92)*	15.06 *(2.99;23.60)*	11.02 *(10.49;11.47)*	12.09 *(11.41;12.82)*	11.13 *(10.49;11.64)*	11.97 *(11.08;12.92)*	10.01 *(9.27;10.66)*
RU	61.02 *(39.25;73.95)*	48.35 *(33.61;59.82)*	41.42 *(13.76;65.52)*	0.00 *(0.00;0.00)*	32.21 *(25.29;37.95)*	36.27 *(29.35;42.42)*	32.64 *(26.20;39.72)*	39.53 *(17.89;55.89)*	19.74 *(3.39;28.59)*
ES	35.96 *(25.07;43.66)*	17.75 *(7.81;28.58)*	23.54 *(7.32;33.46)*	19.93 *(-9.18;23.27)*	20.69 *(18.71;22.95)*	14.26 *(7.11;16.83)*	18.18 *(15.04;21.58)*	21.18 *(16.19;24.46)*	14.01 *(7.65;16.74)*
SI	13.65 *(11.28;16.18)*	7.81 *(2.77;10.96)*	14.55 *(0.51;22.37)*	0.00 *(0.00;0.00)*	13.10 *(11.03;14.57)*	8.34 *(6.63;9.85)*	7.02 *(5.56;8.34)*	7.48 *(3.24;10.06)*	8.62 *(7.49;9.66)*
SE	11.54 *(10.56;12.30)*	7.46 *(4.84;9.74)*	4.95 *(2.53;7.18)*	5.26 *(-0.46;9.97)*	8.10 *(7.79;8.43)*	5.59 *(5.04;6.17)*	4.58 *(4.12;4.94)*	4.26 *(3.62;4.74)*	4.30 *(3.88;4.72)*
CH	14.09 *(11.30;16.52)*	5.92 *(3.93;7.92)*	11.07 *(5.17;15.57)*	4.92 *(1.25;7.12)*	11.29 *(10.54;12.53)*	7.33 *(6.12;8.44)*	7.32 *(6.23;8.35)*	9.68 *(6.84;12.48)*	10.65 *(8.13;12.80)*
UK	24.69 *(23.07;26.44)*	14.30 *(11.31;16.95)*	13.37 *(9.03;16.08)*	7.90 *(5.05;10.11)*	18.47 *(17.89;19.04)*	13.49 *(12.50;14.52)*	12.94 *(12.16;13.68)*	13.48 *(12.07;14.69)*	12.06 *(11.13;12.92)*
US	32.97 *(30.68;35.42)*	19.75 *(17.17;22.45)*	28.47 *(19.74;36.46)*	31.55 *(18.70;44.20)*	20.93 *(19.95;21.82)*	17.75 *(16.39;19.29)*	16.91 *(15.59;18.04)*	17.72 *(16.01;19.76)*	14.81 *(13.44;15.58)*

Note. Point estimates and, in parentheses and italics, 95 percent bootstrap confidence intervals. All indices multiplied with 100. See Table A1 in the Appendix for definition of country codes. Own calculations based on LIS 2000 data.