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Abstract

It is common to decompose the inequality indices of the General Entropy class to understand economic inequality and guide the design of economic policy. Elbers et al. (2008) suggest an improved approach to inequality decomposition of those indices which is less sensitive to the degree of sub-partitioning of population groups than the conventional decompositions. In this paper, we extend the approach of Elbers et al. (2008) to the β class of inequality indices which includes a large variety of inequality indices. This class generalizes and comprises different well-known families of inequality indices as particular cases. Moreover, some of its members enable to focus on a particular part of the income distribution at which redistributive policies could be aimed. We illustrate our methodology using micro datasets from six Arab countries to offer a reassessment of between-group inequality in these countries.

ملخص

من الشائع أن تتحلل مؤشرات عدم المساواة في الطبقة الانتروبيا العام لفهم التفاوت الاقتصادي ولتوجيه تصميم السياسات الاقتصادية. تشير Elbers وآخرون. (2008)إلى نهج محسنة لتحليل مؤشرات عدم المساواة تلك التي هي أقل حساسية لدرجة التقسيم الفرعي للمجموعات السكانية من التحليلات التقليدية. في هذه الورقة، وهي تمديد لنهج Elbers وآخرون. (2008) إلى الفئة β لمؤشرات عدم المساواة التي تضم مجموعة اكبر واكثر تنوعا من مؤشرات عدم المساواة. يعمم هذه الفئة وتضم مختلف العائلات المعروفة من مؤشرات عدم المساواة وبعض الحالات المعينة. علاوة على ذلك ، يتمكن بعض أعضائها من التركيز على جزء معين من توزيع الدخل الذي يمكن أن يستهدف سياسات إعادة التوزيع.و لتوضيح منهجيتنا نقوم باستخدام مجموعة من قواعد البيانات الدقيقة من ست دول عربية لتقديم إعادة تقييم التفاوت بين الفريق في هذه البلدان.

1. Introduction

Decomposing inequality is important for understanding what has happened to welfare disparity and for designing effective redistributive policies. Since the groundbreaking paper of Atkinson (1970) on inequality measurement, much has been written on welfare distribution and other related issues. Over the years, the literature of inequality measurement has evolved into three closely connected but distinct branches: the construction of summary inequality indices, partial inequality orderings, and inequality decomposition. Bibi and El-Lahga (2010)presented a rough snapshot of the inequality level in Arab Countries (ACs), using various inequality statistics for the whole population. To move a step further in understanding inequality, one can evaluate observed inequality between population groups to isolate those groups that contribute the most to overall inequality, and design appropriate redistributive policies for them.

Elbers et al. (2008) note that the level of between-group inequality is sensitive to the number of groups considered and their relative sizes. More precisely, if the population is subdivided into further subgroups, the between group inequality will increase artificially. This may create some difficulties to interpret the importance of between-group inequality when comparing different population groupings. To overcome this limit, Elbers et al. (2008) suggest an alternative measure of the between component defined as the ratio of between inequality to a counterfactual maximum between group inequality that could arise with the same number of groups and the same group sizes.

Considered conventional, the inequality indices used by Elbers et al. (2008) are those of the Generalized Entropy (GE) class, since they are additively decomposable.[1] Despite their attractiveness, the GE inequality indices may be insensitive to changes that occur at some particular income groups—for example the poorest—rendering them irrelevant to assess the effectiveness of a redistributive policy focused on that group.

In this paper, we suggest to perform the Elbers et al.'s (2008) decomposition using a wide class of inequality indices, proposed by Olmedeo et al. (2009). These inequality indices are based on the Bonferroni (1930) curve rather than on the Lorenz curve, and belong to the β class. The β class generalizes and comprises different well-known families of inequality indices as particular cases, such as the Gini index. Moreover, some of its members enable focusing on a particular part of the income distribution at which some redistributive policies could be aimed. This is possible since, in contrast to the GE class, the β class includes indices that are focused on any percentile of the distribution, and not specifically on the percentile at one tail of that distribution.

However, in contrast with the inequality indices of the GE class, the indices of the β class are not additively decomposable. To overcome this limit, we suggest a unified framework, based on the use of the Shapley's (1953) rule, which allows a fair decomposition of any inequality measure into within-group and between-group inequality.

The layout of the paper is as follow. Section 2 recalls the conventional methodology to decompose the GE indices into within-group and between-group inequality. Section 3 illustrates how to use the Shapley's (1953) rule to perform such decompositions for any non-additive inequality measure. Section 4 summarizes Elbers et al.'s (2008) approach. Section 5 presents the β class which will be used to improve our understanding of the determinants of inequality in some Arab countries. Section 6 applies the methodology to six Arab countries. Section 7 concludes.

[1]The decomposability feature of the GE indices makes inequality decomposition (into within-group and between-group inequality), according to certain population groupings, straightforward.

2. Conventional Decomposition

Consider a vector $\mathbf{y}=(y_1, y_2, ..., y_n)$ of living standards y_i (income, for short) for a population of n individuals, where y_i are ordered in increasing values, such that $y_1 \leq y_2 \cdots \leq y_n$.

It is conventional to use inequality indices that are members of the GE class which fulfill some desirable principles such as the Pigou-Dalton transfer principle and the decomposability principle (Shorrocks 1980). Formally, these indices can be written as:

$$I_{GE}(\mathbf{y};\ \theta) = \begin{cases} \dfrac{1}{\theta^2-\theta}\left[\dfrac{1}{n}\sum\limits_{i=1}^{n}\left(\dfrac{y_i}{\bar{y}}\right)^{\theta}-1\right], & \forall y_i > 0,\ \theta \neq 0, 1 \\ \dfrac{1}{n}\sum\limits_{i=1}^{n}\ln\dfrac{\bar{y}}{y_i}, & \forall y_i > 0,\ \theta = 0 \\ \dfrac{1}{n}\sum\limits_{i=1}^{n}\dfrac{y_i}{\bar{y}}\ln\dfrac{y_i}{\bar{y}}, & \forall y_i > 0,\ \theta = 1 \end{cases} \tag{1}$$

In contrast to most inequality measures that lie between 0 and 1 (like the Gini index), the values of GE indices range from zero (perfect equality) to infinity (high level of inequality). The parameter θ represents the weight applied to distances between incomes at different parts of the distribution. It can take any non-negative real value. The lower the value of θ, the more averse a society is to inequality. For $\theta=0$, $I_{GE}(\mathbf{y};0)$ is simply the mean log deviation which, in accordance with the transfer sensitivity principle, is more sensitive to changes that occur in the bottom distribution. $I_{GE}(\mathbf{y};1)$ is the well-known Theil (1967) index. However, for $\theta>1$, GE measures are more sensitive to changes that affect the upper tail of the distribution which make them, from Rawlsian criterion, less appealing for distributional judgments.

As stated above, one of the typical features of the GE family is that it is additively decomposable by population group. Thus, overall inequality is a simple sum of the between-groups inequality denoted by $I_{GE}^{between}(\mathbf{y};\theta)$, and the within-groups inequality denoted by $I_{GE}^{within}(\mathbf{y};\theta)$ such that

$$I_{GE}(\mathbf{y};\theta) = I_{GE}^{between}(\mathbf{y};\theta) + I_{GE}^{within}(\mathbf{y};\theta). \tag{2}$$

Bibi and Nabli (2010) suggested that a simple way to shed light on the extent of opportunities inequality in the ACs is to partition the whole population into some mutually exclusive groups, such that each group includes all individuals with identical circumstances. Examples of circumstances that may be used for such partitioning of the whole population include parents schooling, gender, ethnicity, socio-cultural or religious origin, etc. Given that the effort levels are expected to vary within each group, the within-group component of overall inequality could be deemed as the natural outcome of differences in individual efforts. According to opportunity egalitarian ethics, since the variability of circumstances are beyond the individuals' responsibility, they are inequitable and should be tackled through appropriate policies by the society. One can then calculate the ratio of between-group inequality to overall inequality to obtain an index of inequality of opportunities which lies between 0 and 1. If we denote this index by $R^{between}(\mathbf{y})$, it can be calculated as:

$$R_{GE}^{between}(\mathbf{y};\theta) = \frac{I_{GE}^{between}(\mathbf{y};\theta)}{I_{GE}(\mathbf{y};\theta)}. \tag{3}$$

Undeniably, the literature offers more theoretically sound alternatives to study the distribution of opportunities. But the estimation of equation (3) is easy to implement to fill in an important knowledge gap in opportunities inequality since the empirical applications using datasets from ACs are—to the best of our knowledge—missing.

To describe how this approach can be implemented, let the total population be split into J mutually exclusive subgroups. Also let $\mathbf{y}_j$ be the income distribution of the subgroup j and $\overline{y}_j$ be the average income of j. The between-group inequality is calculated by awarding every person within a group that subgroup's average income, $\overline{y}_j$. $I_{GE}^{between}(\mathbf{y};\theta)$ can then be expressed as :

$$I_{GE}^{between}(\mathbf{y};\theta) = I_{GE}^{between}(\overline{y}_1, ..., \overline{y}_J;\theta) \tag{4}$$

$$= 1\theta^2 - \theta\left[\sum_{j=1}^{J} f_j\left(\overline{y}_j \overline{y}\right)^{\theta} - 1\right], \tag{5}$$

where f_j is the population share of the group j.

The inequality within each group, $I^{within}(\mathbf{y}_j;\theta)$, is calculated using the same formula used for $I_{GE}(\mathbf{y};\theta)$ (as if the subgroup j with the distribution $\mathbf{y}_j$ is a population in its own right). $I_{GE}^{within}(\mathbf{y};\theta)$ is then obtained as a weighted average of $I^{within}(\mathbf{y}_j;\theta)$, and expressed as:

$$I^{within}(\mathbf{y};\theta) = \sum_{j=1}^{J} f_j^{1-\theta} s_j^{\theta} I^{within}(\mathbf{y}_j;\theta) \text{ where } s_j = f_j \overline{y}_j \overline{y} \tag{6}$$

Clearly however, the weights assigned to $I^{within}(\mathbf{y}_j;\theta)$ do not necessarily sum to 1 with the notable exceptions of θ equals either to 0 (the mean log deviation index) or 1 (the Theil index). In the former case, $\theta = 0$, the weighting system is given by the population share of each subgroup (f_j) while in the latter, $\theta = 1$, the weighting system is given by the income share of each subgroup in the total income (s_j).

3. A Unified Framework to Decompose Overall Inequality

If the conventional approach presented above is applied to a non-decomposable inequality index, for instance the Gini coefficient, a residual term emerges

$$I(\mathbf{y}) = I^{between}(\mathbf{y}) + I^{within}(\mathbf{y}) + Residual \tag{7}$$

It is well-known that for the Gini index, the residual term reflects the overlapping components between income groups. To remove the residual term, one can estimate how much inequality would be reduced if the between-group inequality or the within-group inequality are removed.

Take for instance the calculation of the between-group inequality. The first estimate would naturally be given by granting each individual the mean income of the group to which he belongs, i.e $I(\overline{y}_1, ..., \overline{y}_J)$. The second estimate would be given by the difference between the initial (overall) inequality and inequality which would be given by a counterfactual distribution $\mathbf{y}^*$, where between-group inequality is removed and all that is left is within-group inequality. This could be done by adjusting each observation by the ratio $\frac{\bar{y}}{\bar{y}_j}$ so that the mean income of each group becomes $\bar{y}$. Except for the GE indices which are decomposable, these two estimates will differ when the groups' distribution of welfare overlaps. Since it is usually arbitrary to prefer one estimate to the other, we use the Shapley's (1953) rule which consists of two alternatives to take the average of the two estimates:[2]

$$I^{between}(\mathbf{y}) = 0.5I(\bar{y}_1, ..., \bar{y}_J) + 0.5\left(I(\mathbf{y}) - I(\mathbf{y}^*)\right). \tag{8}$$

Analogously, the within-group inequality can be computed as:

$$I^{within}(\mathbf{y}) = 0.5I(\mathbf{y}^*) + 0.5\left(I(\mathbf{y}) - I(\bar{y}_1, ..., \bar{y}_J)\right). \tag{9}$$

Hence, equations (8) and (9) could be applied to any inequality index, in particular to the indices of Olmedeo et al. (2009)— which will be presented in section 5—using a more appropriate decomposition method which we are now going to develop.

4. Reinterpreting Between-Group Inequality

Developments of section 2 clearly show that conventional decomposition of between-group inequality is sensitive, further to differences in average income across groups ($\bar{y}_j$), to the population share of each group (f_j). Since the importance of any pre-defined group often varies across countries, this causes ambiguity when comparing $R^{between}$, i.e., the relative contribution of between-group inequality to overall inequality across countries. Quoting from Elbers et al. (2008),

"The conventional between-group share is calculated by taking the ratio of observed between-group inequality to total inequality. Total inequality, however, can be viewed as the between-group inequality that would be observed if every household in the population constituted a separate group. Thus, the conventional practice is equivalent to comparing observed between-group inequality (across a few groups under examination) against a benchmark (across perhaps millions of groups) that is quite extreme—and probably rather unrealistic (Elbers et al. 2008, p233)."

Based on the shortcoming of the common interpretation of the between-group components, Elbers et al. (2008) suggest a new Benchmark against which between-group inequality is judged. While conventional between-group inequality is calculated as the ratio of between-group component $I^{between}$, to the total inequality I, Elbers et al. (2008) propose the replacement of the denominator with a counterfactual maximum between-group inequality that could be observed, by reassigning individual incomes across the J subgroups in partition Π of size $j(n)$. More specifically, let J be the number of subgroups. For a particular permutation of subgroups $g(j), j = 1,...,J$, we assign the lowest incomes to $g(1)$, then to $g(2)$, and the highest incomes to $g(J)$. The next step is to calculate the corresponding between-group inequality for this counterfactual distribution. The maximum between-group inequality, i.e.,

$$I^{between}_{\max}(\Pi) = \max\{I^{between} \mid \Pi(j(n), J)\} \tag{10}$$

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[2] Shorrocks (1999) has introduced the Shapley's (1953) in the decomposition of distributive indices. Araar (2006) and Duclos and Araar (2006) have applied equations (8) and (9) to decompose the Gini index into within-group and between-group inequality components. Bibi and Duclos (2010) give the formula of the Shapley's (1953) rule in the case of more than two alternatives.

is defined as the highest between component obtained among all possible $J!$ permutations of subgroups. Thus, the ratio

$$\hat{R}^{between}(\Pi)=\frac{I^{between}(\Pi)}{I_{\max}^{between}(\Pi)}=R^{between}(\Pi)\frac{I(\mathbf{y})}{I_{\max}^{Between}(\Pi)} \tag{11}$$

is used as a complement to the ratio $R^{between}(\Pi)=\frac{I^{between}(\Pi)}{I(\mathbf{y})}$ to assess the extent of population group disparities. The denominator denotes the maximum between-group inequality that could arise by reassigning individuals across the J sub-groups in partition Π of size $j(n)$. The most important features of the index proposed in equation (11) is that between-group inequality does not automatically increase when we consider a finer partition of the population (more subgroups), because both the numerator and the denominator in equation (11) change simultaneously with the number of groups considered.

In order to calculate the new index, we need three components: the total inequality measure given by $I(\mathbf{y})$, the usual between group component $I^{between}(\Pi)$ (obtained by the conventional decompositions of the GE indices and the Shapley's rule described by equation (8) for the non-decomposable indices), and maximum between-group inequality $I_{\max}^{between}(\Pi)$. We note that between-group inequality attains its maximum when subgroups income ranges do not overlap. To see how $I_{\max}^{between}(\Pi)$ can be estimated, we consider two population groups j and k. The between-group inequality is maximized when either the richest in j is poorer than the poorest in k or the poorest in j is richer than the richest in k. The procedure to estimate $I_{\max}^{between}(\Pi)$ then works as follows: the $j(n)$ lowest incomes are assigned to the members of group j and the remaining incomes are assigned to the group k. It results in a first possibility of between-group inequality, $I_1^{between}(\Pi)$. Then, the $j(n)$ highest incomes are assigned to the members of group j and the remaining incomes are assigned to the group k. It results a second possibility of between-group inequality, call it $I_2^{between}(\Pi)$. $I_{\max}^{between}(\Pi)$ is therefore equal to $\max\{I_1^{between}(\Pi), I_2^{between}(\Pi)\}$. In the case of J subgroups we can apply the same pattern for all possible permutation $J!$ of population groups.

Elbers et al. (2008) note that some reordering of the group may imply some counterintuitive counterfactual distribution. For instance, assigning lowest incomes to the white population in the United States or South Africa is clearly an unrealistic situation. The authors suggest introducing more structure to the approach proposed and restrict attention to subgroup permutations that respect the 'pecking order' of subgroups' mean incomes. This leads for instance to exclude some situation such that the unskilled or the illiterates are the better off group. Hence, the maximum possible between-group inequality will be obtained given the current income distribution, relative subgroup sizes, and their rankings by mean incomes.

5. The Scaled Conditional Mean Curve and the Bonferroni Class of Inequality Indices

An interesting alternative description of the income distribution can be derived by introducing a simple transformation of the Lorenz curve

$$B(p)=\begin{cases}\dfrac{L(p)}{p}, & 0<p\le 1\\ 0, & p=0.\end{cases} \tag{12}$$

The curve $B(p)$ is known as Bonferroni curve or the scaled mean curve. Like the Lorenz curve, it lies between 0 and 1. For any $p>0$, $B(p)$ is also the ratio between the mean income of the poorest $100p\%$ of the population (i.e., $\frac{1}{p}\int_0^p y(q)dq$) and the overall mean income, μ_y. Thus, the Bonferroni curve gives an alternative ethical judgment about income distribution to that given by Lorenz curve. The values of $B(p)$ refer to relative income levels, while those of $L(p)$ are fractions of the total income held by the poorest $100p\%$ of the population.

The line of perfect equality is defined by $B(p)=1, \forall\, 0 \leq p \leq 1$. However, in the case of extreme inequality, where one person holds the whole income, $B(p)$ will take the value 0 $\forall\, 0 \leq p < 1$, and 1 for $p=1$. Finally, when incomes are uniformly distributed over an interval $(0, a)$, the Bonferroni curve coincides with the diagonal line joining points $(0,0)$ and $(1,1)$.

Turning now to the construction of inequality indices based on the Bonferroni curve. For a given $p \in [0, 1]$ the quantity

$$D(p) = 1 - B(p), \tag{13}$$

can be considered as a local measure of inequality accumulated up to percentile p. Indeed, $D(p)$ measures the relative difference between the whole mean income and the mean income of the poorest $100p\%$ individuals.

The next step is to aggregate the $D(p)$, $p\,1 \in 1[0, 1]$, into an overall inequality index, call it I_B, using an appropriate weighting system $\omega(p)$ such that $\int_0^1 \omega(p)dp = 1$.[3] There are plenty of possibilities. For instance, setting $\omega(p)=1\ \forall\ p$ yields the Bonferroni index of inequality,

$$I_B = \int_0^1 \left(1 - B(p)\right) dp = \int_0^1 \frac{1}{p}\left(p - L(p)\right) dp. \tag{14}$$

The index I_B lies between values 0 and 1 for perfect equality and extreme inequality, respectively. However, despite the fact that such index has attractive proprieties, it has been seldom used in distributive analyses. As can be seen from equation (14), the I_B index assigns more weight to local inequality on the left-hand-side of the income distribution. Such weighting schemes introduce a specific value judgment in the measure of inequality, since it focuses on the most deprived individuals.

One can think that if more flexible weighting schemes could be found to aggregate the distance $\left(1 - B(p)\right)$, a variety of inequality measures depending on which income group the focus should be put on may result. In a recent paper, Olmedo et al. (2009) proposed a new class of inequality indices, which assigned a non-monotonic weight to local inequality. The new class is obtained by applying the probability density of the β distribution to the distance $\left(1 - B(p)\right)$. Denote those weights by $\omega_{s,t}(p)$, over the interval [0,1] where

$$\omega_{s,t}(p) = \frac{1}{\int_0^1 p^{s-1}(1-p)^{t-1} dp}\, p^{s-1}(1-p)^{t-1}, \tag{15}$$

and where s and t are non-negative parameters which characterize the shape of the β density. It results the β class of inequality indices defined as

[3]This approach underlies implicitly or explicitly several contributions to the inequality literature, in particular those of Mehran (1976) and Yitzhaki (1983).

$$I(s,t)=\int_0^1 \omega_{s,t}(p)\left(1-B(p)\right)dp. \tag{16}$$

Given the proprieties of the β density function, it can be shown that for $0<s<1$ and $0<t<1$, more weights are assigned to local inequality in the tails of income distribution (i.e. $\omega_{(s,t)}(p)$ is U shaped). For $0<s<1$ but $t\geq 1$ (respectively $s\geq 1$ but $0<t<1$), the weighting system is more focused on the poorest (richest) population given that $\omega_{s,t}(p)$ is decreasing and convex (increasing and convex). When both s and t are greater than 1 and closer to each other, greater weights are assigned to middle incomes.

Clearly then, by varying parameters s and t, one can obtain a wide class of inequality measures based on a unified theoretical framework. For instance, if $(s,t)=(1,1)$, then $I(1,1)$ corresponds to the Bonferroni index given by (14). However, when $(s,t)=(2,1)$, we obtain the well-known Gini index.

The $I(s,t)$ is further large enough to encompass, for some particular values of either s or t, families of inequality indices that generalize the Gini index or the Bonferroni yardstick. Setting $s=2$ and $t=\upsilon-1$, we obtain the s-Gini class of inequality measures defined by:

$$\begin{aligned} I(2,t) &= t(t+1)\int_0^1 p(1-p)^{t-1}\left(1-B(p)\right)dp \\ &= t(t+1)\int_0^1 (1-p)^{t-1}\left(p-L(p)\right)dp \\ &= (\upsilon-1)\upsilon\int_0^1 (1-p)^{\upsilon-2}\left(p-L(p)\right)dp \\ &= I(\upsilon) \end{aligned} \tag{17}$$

When instead $s=1$, we obtain a first generalization of the Bonferroni index suggested by Imedeo et al. (2009),

$$I(1,t)=t\int_0^1 (1-p)^{t-1}\left(1-B(p)\right)dp. \tag{18}$$

The second way to generalize the Bonferroni index consists in fixing t to 1 for any $s\geq 1$. This way is followed in Aaberge (2008) who suggested the $I(s,1)$ family of inequality indices,

$$\begin{aligned} I(s,1) &= s\int_0^1 p^{s-1}\left(1-B(p)\right)dp, \\ &= s\int_0^1 p^{s-2}\left(p-L(p)\right)dp. \end{aligned} \tag{19}$$

For $s=1$, $I(s,1)$ is simply the Bonferroni index while for $s=2$, $I(s,1)$ it reduces to the Gini index.

6. Application to Six Arab Countries

6.1 Data

We use data from a set of available household expenditure surveys for six Arab countries. The list of surveys as well as their coverage periods is given in Table 2. These surveys contain a broad array of information on household expenditures on durable and non-durable goods. All datasets contain detailed information on the household's socio-economic characteristics. For some countries, household income is also reported.

6.2 Decomposition results

We use total household expenditure *per capita* for valuing and comparing the individual's well-being across the data. Observations are weighted by their sample weights multiplied by household size. For most countries having the pertinent data, overall inequality is decomposed according to: gender, educational group, geographical regions and urban rural areas. For the United Arab Emirates, we also decompose inequality by nationals and immigrants.

Tables 2 to 11 present results of our decomposition of $I(1,t)$ and $I(s,1)$ for different values of t and s, respectively. Recall that $I(1,t)$ increasingly focuses on low incomes as t rises. However, $I(s,1)$ is increasingly sensitive to the changes that occur at the high incomes for large values of s.

Based on the standard approach to decomposing inequality, as described in section 2, between-group inequality in each selected country of our list is rather low. However, using Elbers et al.'s (2008) alternative measure — referred to as "*ratio between*" in Tables 2 to 11—we find that between-group inequality could attain for some breakdowns more than 50 percent of the "maximum possible" between-group inequality.

Urban-rural disparities

Tables 1 to 10 show that urban-rural disparities are an important contributor to the "maximum possible" between-group inequality in Tunisia (Tables 2 to 4), and Morocco (Table 7 and 8); but not in Yemen, Syria and Jordan. The more recent available surveys in Tunisia and Morocco show that the ratio of between-group inequality to its "maximum possible" is significantly higher when it is based on low-income-index-based ($I(1,5)$) rather than high-income-index-based ($I(5,1)$). This result may be explained by the concentration of the poor in rural areas and by their lower living standard with regards to their urban counterparts.

Gender disparities

When breaking down the population by gender, the within-group inequality appears to contribute the most to overall inequality, principally in Yemen but also in Morocco, Syria, and Jordan. However, the contribution of the between-group gender inequality in Morocco has significantly increased from 1991 to 1999. Although this increase is not sensitive to the choice of the inequality index, it is more pronounced for the low-income-indices-based ($I(1,5)$). This result may reveal an issue of feminization of poverty in Morocco which should be more deeply investigated and, if established, tackled.

Population breakdown by education

The between-education share of inequality can attain 29 percent of the "maximum possible" between-education inequality in Jordan and UAE and even much more in Morocco and Tunisia, while this ratio stands at about 15 to 19 percent in Yemen and Syria. The drivers behind these results could be either higher return to education or high inequality of opportunities in access to education.

7. Conclusion and Policy Implications

Decomposition by population group has been the leading approach to quantifying how education, age, etc. affect overall inequality. It offers a useful tool in describing inequality patterns, and identifying its sources. Indeed, although subgroup decomposition methods are considered as purely descriptive, many social policies, designed to reduce inequality between or within given groups, are often based on such exercises. For example, when the between group component of inequality is less pronounced than the within group component, anti-inequality policies should be focused on equalizing within group outcomes. Such conclusion does not imply that differences in incomes between groups have lower policy priority, but simply that these differences are relatively small compared to income inequality within each group.

Bibi and Nabli (2010) suggested that a simple way to shed light on the extent of inequality of opportunities in ACs is to partition the whole population into some mutually exclusive groups, such that each group includes all individuals with identical circumstances. Examples of circumstances that may be used for such partitioning of the whole population include parents' schooling, gender, ethnicity, socio-cultural or religious origin, etc. Given that the effort levels are expected to vary within each group, the within-group component of overall inequality could be deemed as the natural outcome of differences in individual efforts. From an inequality of opportunity point of view, we can conclude that within-group inequality should not be the first priority of the redistributive policies as long as we admit that it is the result of individual responsibility, which is outside the scope of justice.

However, if we agree that the between-group inequality reflects only the variability of circumstances across individuals, we can use it as an estimate of the inequality of opportunities. According to opportunity egalitarian ethics, since the variability of circumstances are beyond the individual's responsibility, they are inequitable and should be tackled, through appropriate policies by the society. Undeniably, the literature offers more theoretically sound alternatives to study the distribution of opportunities. But if overall inequality is decomposed using a theoretically sound approach, it is possible to shed light on the extent of inequality of opportunities in ACs, since the empirical applications on this subject remain scarce.

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Table 1: A List of Available Country Surveys

Country	Survey	Year	Already available?
Tunisia	HBCS	1990,1995,2000	Yes
Morocco	HBCS	1991, 1998	Yes
Yemen	HBCS	2006	Yes
Syria	HIES	2004, 2007	Yes
Jordan	HEIS	2002	Yes
Emirates	HBS	2008	Yes

Table 2: Decomposition of Bonferroni Inequality Indices: Tunisia 1990

Group	I(1,1)	I(1,2)	I(1,3)	I(1,4)	I(1,5)	I(2,1)	I(3,1)	I(4,1)	I(5,1)
Rural	.467	.580	.633	.666	.689	.354	.295	.257	.230
Urban	.485	.597	.649	.681	.704	.374	.315	.277	.250
Total inequality	.517	.633	.686	.718	.740	.401	.339	.298	.269
Between inequality	.129	.169	.185	.192	.195	.090	.067	.053	.043
Within inequality	.387	.464	.501	.526	.545	.311	.272	.246	.226
Maximum between	.267	.338	.366	.378	.384	.196	.153	.125	.107
Ratio Between	.485	.499	.505	.508	.509	.459	.437	.419	.406
Tunis	.502	.613	.664	.695	.716	.392	.332	.293	.265
North-East	.512	.628	.682	.713	.734	.396	.333	.292	.262
North-West	.494	.611	.665	.697	.719	.377	.314	.273	.244
Center-West	.482	.597	.652	.685	.707	.367	.306	.266	.239
Center-East	.493	.610	.665	.699	.721	.377	.315	.276	.248
South-West	.458	.567	.618	.648	.669	.350	.292	.255	.228
South-East	.431	.534	.583	.612	.632	.328	.274	.239	.214
Total inequality	.517	.633	.686	.718	.740	.401	.339	.298	.269
Between inequality	.115	.143	.153	.158	.160	.087	.069	.058	.050
Within inequality	.402	.490	.533	.560	.580	.314	.270	.241	.220
Maximum between	.415	.495	.522	.534	.540	.336	.284	.248	.221
Ratio Between	.277	.289	.294	.296	.297	.258	.244	.233	.225
Illiterate	.486	.602	.657	.690	.712	.370	.309	.269	.240
Primary	.478	.591	.644	.677	.699	.365	.306	.268	.240
Secondary	.473	.585	.640	.674	.698	.361	.304	.267	.240
University	.468	.575	.627	.659	.680	.361	.305	.270	.244
Total inequality	.517	.633	.686	.718	.740	.401	.339	.298	.269
Between inequality	.111	.126	.129	.130	.130	.097	.086	.077	.071
Within inequality	.405	.507	.557	.589	.610	.304	.253	.221	.199
Maximum between	.342	.385	.393	.392	.389	.299	.264	.237	.217
Ratio Between	.326	.327	.329	.331	.333	.325	.326	.326	.326

Table 3: Decomposition of Bonferroni Inequality Indices: Tunisia 1995

Group	I(1,1)	I(1,2)	I(1,3)	I(1,4)	I(1,5)	I(2,1)	I(3,1)	I(4,1)	I(5,1)
Rural	.460	.571	.623	.655	.678	.350	.292	.255	.228
Urban	.501	.612	.665	.696	.718	.389	.330	.291	.263
Total inequality	.530	.645	.697	.727	.748	.416	.354	.313	.283
Between inequality	.142	.186	.204	.212	.216	.099	.073	.058	.048
Within inequality	.388	.459	.493	.515	.532	.317	.281	.255	.235
Maximum between	.263	.341	.376	.393	.402	.185	.141	.115	.097
Ratio between	.540	.544	.543	.540	.537	.532	.518	.504	.492
Tunis	.503	.613	.664	.695	.716	.393	.333	.295	.266
North-East	.518	.633	.685	.715	.736	.404	.341	.299	.269
North-West	.495	.607	.659	.690	.711	.383	.323	.284	.256
Center-West	.477	.590	.643	.675	.697	.365	.306	.268	.241
Center-East	.517	.631	.684	.715	.736	.403	.341	.301	.272
South-West	.437	.546	.599	.631	.653	.328	.272	.236	.210
South-East	.455	.567	.618	.649	.670	.344	.284	.246	.218
Total inequality	.530	.645	.697	.727	.748	.416	.354	.313	.283
Between inequality	.136	.173	.188	.195	.199	.099	.077	.063	.053
Within inequality	.394	.472	.509	.532	.549	.317	.277	.250	.230
Maximum between	.437	.520	.550	.565	.573	.353	.300	.264	.236
Ratio between	.311	.332	.341	.345	.348	.280	.257	.239	.225

Table 4: Decomposition of Bonferroni Inequality Indices: Tunisia 2000

Group	I(1,1)	I(1,2)	I(1,3)	I(1,4)	I(1,5)	I(2,1)	I(3,1)	I(4,1)	I(5,1)
Urban	.499	.609	.660	.691	.712	.389	.331	.292	.265
Rural	.465	.573	.625	.657	.679	.356	.299	.262	.235
Total inequality	.515	.626	.677	.708	.729	.404	.344	.304	.275
Between inequality	.112	.146	.159	.165	.168	.079	.059	.046	.038
Within inequality	.403	.480	.518	.543	.561	.325	.285	.258	.237
Maximum between	.268	.335	.361	.372	.377	.200	.158	.130	.112
Ratio Between	.419	.434	.441	.443	.444	.393	.371	.354	.342
Tunis	.493	.599	.647	.676	.695	.386	.329	.290	.263
North-East	.482	.591	.643	.675	.696	.372	.315	.277	.250
North-west	.468	.575	.624	.653	.673	.362	.304	.267	.240
Center-West	.494	.606	.658	.690	.711	.381	.321	.282	.254
Center-East	.506	.616	.667	.698	.719	.396	.336	.298	.270
South-West	.463	.567	.616	.645	.665	.358	.302	.266	.240
South-East	.496	.607	.659	.690	.710	.385	.325	.287	.259
Total inequality	.515	.626	.677	.708	.729	.404	.344	.304	.275
Between inequality	.106	.129	.137	.141	.144	.083	.068	.058	.050
Within inequality	.409	.497	.540	.566	.585	.321	.275	.246	.225
Maximum between	.421	.498	.525	.537	.543	.344	.293	.258	.232
Ratio Between	.252	.259	.262	.263	.264	.242	.233	.224	.216

Table 5: Decomposition of Bonferroni Inequality Indices: Yemen 1998

Group	I(1,1)	I(1,2)	I(1,3)	I(1,4)	I(1,5)	I(2,1)	I(3,1)	I(4,1)	I(5,1)
Urban	.461	.565	.614	.644	.665	.356	.301	.266	.240
Rural	.445	.557	.611	.645	.669	.333	.276	.240	.214
Total inequality	.454	.565	.618	.651	.674	.344	.287	.251	.225
Between inequality	.031	.035	.035	.035	.035	.028	.025	.022	.020
Within inequality	.423	.530	.583	.616	.639	.316	.262	.229	.205
Maximum between	.236	.293	.314	.323	.326	.179	.142	.117	.100
Ratio between	.132	.118	.112	.110	.109	.154	.173	.189	.200
Region 1	.408	.513	.566	.599	.623	.304	.252	.219	.196
Region 2	.456	.559	.606	.633	.651	.354	.298	.262	.236
Aden region	.414	.512	.559	.588	.607	.317	.266	.233	.210
Taiz-Ibb	.474	.588	.642	.674	.696	.360	.299	.260	.232
Region 5	.421	.523	.572	.603	.624	.319	.267	.233	.208
Region 6	.442	.549	.602	.634	.657	.334	.278	.243	.218
Sana'a City	.475	.582	.632	.663	.684	.368	.311	.274	.248
Total inequality	.454	.565	.618	.651	.674	.344	.287	.251	.225
Between inequality	.057	.073	.081	.086	.089	.041	.033	.029	.026
Within inequality	.397	.492	.537	.565	.586	.303	.254	.222	.199
Maximum between	.352	.417	.439	.448	.451	.287	.244	.214	.193
Ratio Between	.162	.175	.184	.191	.197	.143	.137	.135	.135
Female	.480	.589	.640	.670	.689	.371	.312	.274	.247
Male	.453	.563	.617	.650	.673	.342	.286	.250	.224
Total inequality	.454	.565	.618	.651	.674	.344	.287	.251	.225
Between inequality	.001	.002	.003	.004	.004	.000	.000	.000	.000
Within inequality	.453	.562	.615	.647	.670	.343	.287	.251	.225
Maximum between	.149	.221	.268	.301	.326	.077	.052	.040	.033
Ratio Between	.009	.011	.012	.012	.013	.006	.004	.004	.003
Illiterate	.443	.555	.610	.644	.668	.330	.273	.236	.211
Primary	.445	.553	.605	.637	.659	.337	.282	.246	.221
Secondary	.456	.561	.611	.642	.663	.350	.295	.260	.235
University	.465	.566	.611	.637	.655	.365	.309	.273	.247
Total Inequality	.454	.565	.618	.651	.674	.344	.287	.251	.225
Between inequality	.046	.054	.056	.057	.057	.038	.033	.029	.026
Within inequality	.408	.511	.562	.594	.617	.306	.254	.222	.199
Maximum between	.282	.319	.326	.326	.324	.246	.216	.194	.177
Ratio Between	.163	.168	.172	.174	.176	.155	.152	.149	.147

Note: Region 1 = Sana'a-Sadah-Mareb-Aljouf; Region 2 = Albaida-Lahj-Abyn; Region 5= Hajah-mahwet-hodeida-Dhamar: Region 6 = Shabwah-Hadhramaut-Almahara

Table 6: Decomposition of Bonferroni Inequality Indices: UAE 2008

Group	I(1,1)	I(1,2)	I(1,3)	I(1,4)	I(1,5)	I(2,1)	I(3,1)	I(4,1)	I(5,1)
Emarati	.496	.621	.671	.701	.722	.397	.336	.296	.267
Others	.509	.563	.614	.645	.666	.348	.292	.255	.229
Total inequality	.456	.608	.661	.692	.713	.383	.323	.283	.255
Between inequality	.021	.026	.027	.027	.027	.017	.014	.012	.010
Within inequality	.474	.583	.634	.665	.686	.366	.308	.271	.245
Maximum between	.230	.255	.258	.256	.254	.205	.182	.164	.148
Ratio between	.093	.100	.104	.106	.107	.085	.079	.073	.069
Abudhabi	.475	.591	.646	.679	.701	.358	.297	.258	.230
Dubai	.469	.581	.635	.667	.689	.357	.299	.261	.235
Sharjah	.391	.490	.540	.571	.592	.291	.240	.209	.187
Others	.470	.576	.625	.654	.674	.363	.305	.267	.240
Total inequality	.496	.608	.661	.692	.713	.383	.323	.283	.255
Between inequality	.129	.157	.167	.172	.175	.101	.084	.071	.062
Within inequality	.367	.451	.493	.519	.538	.282	.239	.212	.193
Maximum between	.373	.453	.485	.501	.510	.292	.243	.209	.185
Ratio between	.347	.347	.345	.344	.343	.347	.344	.340	.336
Illiterate	.535	.633	.676	.702	.719	.438	.385	.350	.325
Primary	.476	.588	.640	.669	.689	.364	.303	.263	.235
Secondary	.469	.579	.630	.661	.682	.359	.301	.263	.236
University	.455	.562	.612	.642	.662	.348	.291	.254	.227
Total inequality	.496	.608	.661	.692	.713	.383	.323	.283	.255
Between inequality	.095	.122	.133	.140	.145	.069	.055	.046	.039
Within inequality	.400	.487	.527	.551	.568	.314	.268	.238	.216
Maximum between	.357	.439	.472	.491	.501	.275	.227	.194	.171
Ratio between	.267	.277	.282	.286	.289	.252	.243	.235	.228

Table 7: Decomposition of Bonferroni Inequality Indices: Morocco 1991

Group	I(1,1)	I(1,2)	I(1,3)	I(1,4)	I(1,5)	I(2,1)	I(3,1)	I(4,1)	I(5,1)
Urban	.488	.598	.650	.682	.703	.377	.319	.281	.254
Rural	.411	.510	.557	.586	.606	.313	.261	.227	.204
Total inequality	.499	.604	.651	.679	.698	.393	.335	.297	.269
Between inequality	.138	.167	.174	.176	.175	.109	.088	.073	.062
Within inequality	.361	.437	.477	.504	.523	.284	.247	.224	.207
Maximum between	.271	.328	.346	.352	.355	.214	.175	.148	.128
Ratio between	.509	.508	.503	.498	.493	.511	.503	.494	.486
South	.510	.605	.644	.665	.678	.416	.360	.322	.294
Tensift	.468	.565	.609	.635	.652	.372	.320	.286	.261
Center	.479	.582	.630	.657	.675	.375	.319	.282	.256
North-West	.502	.610	.658	.685	.703	.394	.334	.294	.266
Center-North	.496	.595	.639	.664	.680	.396	.340	.303	.275
East	.474	.589	.644	.677	.699	.359	.298	.259	.232
Center-South	.458	.559	.602	.626	.642	.358	.302	.264	.236
Total inequality	.499	.604	.651	.679	.698	.393	.335	.297	.269
Between inequality	.066	.084	.092	.095	.097	.047	.036	.029	.024
Within inequality	.433	.520	.560	.584	.601	.346	.299	.268	.245
Maximum between	.423	.501	.529	.542	.549	.346	.296	.262	.236
Ratio between	.156	.169	.173	.176	.177	.137	.123	.111	.102
Male	.506	.609	.655	.682	.700	.403	.345	.307	.278
Female	.439	.552	.608	.642	.665	.326	.269	.233	.209
Total inequality	.499	.604	.651	.679	.698	.393	.335	.297	.269
Between inequality	.005	.005	.005	.005	.005	.004	.004	.003	.003
Within inequality	.494	.599	.646	.674	.692	.389	.331	.293	.266
Maximum between	.176	.182	.179	.177	.175	.170	.163	.155	.147
Ratio between	.027	.029	.030	.030	.030	.025	.024	.023	.022

Table 8: Decomposition of Bonferroni inequality indices: Morocco 1999

Group	I(1,1)	I(1,2)	I(1,3)	I(1,4)	I(1,5)	I(2,1)	I(3,1)	I(4,1)	I(5,1)
Urban	.486	.588	.635	.663	.682	.384	.328	.291	.264
Rural	.423	.530	.582	.614	.637	.317	.262	.227	.202
Total inequality	.505	.612	.661	.691	.711	.399	.341	.303	.275
Between inequality	.140	.176	.189	.194	.196	.103	.081	.066	.056
Within inequality	.366	.436	.472	.496	.514	.295	.260	.237	.220
Maximum between	.266	.325	.345	.353	.356	.208	.169	.142	.123
Ratio between	.524	.540	.548	.551	.552	.498	.477	.463	.453
South	.514	.622	.671	.699	.718	.406	.346	.307	.278
Tensift	.485	.585	.631	.658	.676	.385	.331	.294	.268
Center	.494	.597	.645	.674	.694	.391	.336	.300	.274
North-West	.498	.605	.653	.683	.702	.391	.334	.296	.268
Center-North	.505	.609	.656	.683	.702	.401	.344	.305	.277
East	.451	.562	.616	.649	.672	.339	.282	.245	.219
Center-South	.497	.598	.644	.671	.689	.397	.342	.306	.280
Total Inequality	.505	.612	.661	.691	.711	.399	.341	.303	.275
Between inequality	.062	.077	.083	.085	.086	.047	.038	.031	.027
Within inequality	.443	.535	.579	.606	.625	.351	.303	.271	.248
Maximum between	.411	.487	.514	.526	.533	.336	.288	.254	.228
Ratio between	.151	.159	.161	.162	.162	.141	.132	.124	.118
Male	.504	.610	.659	.688	.709	.399	.341	.304	.276
Female	.494	.603	.654	.684	.705	.384	.326	.287	.260
Total inequality	.505	.612	.661	.691	.711	.399	.341	.303	.275
Between inequality	.013	.014	.014	.014	.014	.013	.012	.011	.010
Within inequality	.492	.598	.647	.676	.696	.386	.329	.292	.265
Maximum between	.174	.177	.174	.171	.169	.170	.163	.156	.150
Ratio between	.078	.081	.083	.084	.085	.074	.072	.070	.069
Illiterate	.447	.555	.606	.637	.659	.340	.285	.249	.223
Primary	.461	.573	.627	.660	.682	.349	.291	.253	.226
Secondary	.498	.612	.666	.697	.719	.384	.323	.284	.256
University	.498	.623	.680	.713	.734	.372	.304	.261	.230
Total inequality	.505	.612	.661	.691	.711	.399	.341	.303	.275
Between inequality	.114	.121	.121	.120	.118	.107	.100	.094	.088
Within inequality	.391	.491	.540	.571	.592	.292	.241	.209	.187
Maximum between	.297	.321	.321	.318	.314	.274	.251	.231	.215
Ratio between	.384	.377	.376	.376	.377	.391	.399	.405	.410

Table 9: Decomposition of Bonferroni Inequality Indices: Syria 2003

Group	I(1,1)	I(1,2)	I(1,3)	I(1,4)	I(1,5)	I(2,1)	I(3,1)	I(4,1)	I(5,1)
Rural	.440	.540	.588	.616	.636	.341	.288	.253	.229
Urban	.481	.583	.630	.658	.677	.379	.324	.287	.260
Total inequality	.475	.576	.623	.651	.671	.374	.319	.283	.257
Between inequality	.068	.086	.091	.094	.094	.051	.040	.032	.027
Within inequality	.407	.491	.532	.558	.576	.323	.279	.251	.230
Maximum between	.255	.306	.322	.328	.330	.203	.168	.143	.124
Ratio Between	.268	.280	.284	.285	.286	.252	.237	.225	.216
South	.457	.555	.602	.632	.653	.358	.306	.273	.248
North, East	.471	.569	.613	.640	.658	.373	.319	.283	.257
Center	.479	.575	.618	.644	.662	.383	.330	.295	.269
Costal	.451	.557	.607	.637	.658	.345	.289	.253	.227
Total inequality	.475	.576	.623	.651	.671	.374	.319	.283	.257
Between inequality	.050	.063	.067	.069	.070	.037	.028	.023	.019
Within inequality	.425	.514	.556	.582	.601	.337	.291	.260	.238
Maximum between	.310	.355	.365	.367	.367	.264	.229	.201	.179
Ratio Between	.161	.177	.184	.188	.190	.139	.124	.112	.103
Female	.512	.614	.660	.687	.706	.411	.356	.319	.292
Male	.471	.573	.620	.648	.667	.370	.315	.279	.253
Total inequality	.475	.576	.623	.651	.671	.374	.319	.283	.257
Between inequality	.008	.008	.008	.008	.008	.008	.007	.007	.007
Within inequality	.467	.569	.615	.644	.663	.366	.312	.276	.250
Maximum between	.113	.113	.110	.108	.107	.114	.112	.110	.107
Ratio Between	.068	.070	.071	.071	.072	.067	.066	.066	.066
illiterate	.458	.557	.603	.632	.651	.358	.306	.271	.246
Primary	.444	.545	.592	.621	.641	.344	.291	.256	.231
Secondary	.470	.574	.622	.651	.671	.366	.310	.273	.246
University	.515	.623	.672	.700	.719	.406	.346	.306	.277
Total inequality	.475	.576	.623	.651	.671	.374	.319	.283	.257
Between inequality	.063	.071	.073	.074	.074	.055	.049	.044	.041
Within inequality	.412	.505	.550	.577	.596	.319	.270	.239	.216
Maximum between	.352	.411	.432	.441	.446	.294	.256	.230	.210
Ratio Between	.179	.173	.170	.168	.167	.187	.191	.193	.193

Table 10: Decomposition of Bonferroni Inequality Indices: Syria 2007

Group	I(1,1)	I(1,2)	I(1,3)	I(1,4)	I(1,5)	I(2,1)	I(3,1)	I(4,1)	I(5,1)
Rural	.423	.517	.562	.589	.608	.329	.279	.247	.224
Urban	.422	.518	.564	.592	.611	.326	.275	.242	.218
Total inequality	.436	.534	.580	.609	.628	.338	.286	.252	.228
Between inequality	.060	.077	.084	.086	.088	.042	.031	.024	.020
Within inequality	.376	.457	.497	.522	.540	.296	.254	.228	.208
Maximum between	.232	.284	.303	.310	.314	.179	.145	.121	.104
Ratio between	.257	.271	.276	.278	.279	.235	.217	.202	.190
South	.420	.518	.565	.594	.615	.322	.271	.238	.214
North-East	.423	.518	.566	.596	.617	.328	.280	.250	.228
Middle	.428	.520	.563	.590	.608	.336	.287	.255	.231
Coastal	.391	.481	.525	.552	.571	.300	.253	.222	.201
Total inequality	.436	.534	.580	.609	.628	.338	.286	.252	.228
Between inequality	.064	.080	.085	.087	.088	.049	.039	.032	.028
Within inequality	.372	.454	.495	.521	.540	.289	.247	.220	.200
Maximum between	.295	.337	.347	.349	.349	.253	.222	.198	.180
Ratio between	.218	.236	.245	.249	.252	.193	.175	.162	.153
Male	.432	.530	.576	.604	.624	.334	.282	.248	.224
Female	.479	.579	.624	.651	.670	.378	.323	.286	.259
Total inequality	.436	.534	.580	.609	.628	.338	.286	.252	.228
Between inequality	.007	.007	.007	.007	.007	.007	.007	.007	.007
Within inequality	.429	.527	.573	.601	.621	.331	.279	.245	.221
Maximum between	.097	.097	.095	.094	.092	.097	.095	.093	.091
Ratio between	.075	.075	.076	.076	.076	.074	.074	.074	.073
illiterate	.409	.505	.550	.579	.598	.314	.264	.233	.210
Primary	.412	.507	.553	.582	.602	.317	.268	.236	.213
Secondary	.427	.527	.575	.604	.623	.327	.275	.241	.216
University	.448	.552	.601	.631	.651	.343	.289	.254	.229
Total inequality	.436	.534	.580	.609	.628	.338	.286	.252	.228
Between inequality	.067	.080	.085	.088	.090	.055	.047	.042	.038
Within inequality	.369	.454	.495	.521	.538	.283	.239	.210	.190
Maximum between	.318	.381	.409	.426	.437	.255	.220	.197	.180
Ratio between	.212	.210	.208	.206	.206	.215	.214	.212	.210

Table 11: Decomposition of Bonferroni Inequality Indices: Jordan 1997

Group	I(1,1)	I(1,2)	I(1,3)	I(1,4)	I(1,5)	I(2,1)	I(3,1)	I(4,1)	I(5,1)
Urban	.508	.620	.673	.706	.728	.395	.335	.297	.269
Rural	.437	.555	.615	.653	.680	.319	.262	.226	.200
Total inequality	.496	.609	.664	.697	.721	.384	.325	.287	.260
Between inequality	.053	.074	.086	.093	.097	.031	.021	.016	.014
Within inequality	.444	.535	.578	.604	.623	.352	.304	.271	.246
Maximum between	.228	.307	.346	.367	.380	.150	.110	.088	.074
Ratio between	.231	.242	.248	.253	.255	.208	.194	.187	.183
Region 1	.513	.624	.676	.708	.730	.402	.343	.305	.277
Region 2	.457	.569	.625	.661	.686	.345	.289	.253	.228
Total inequality	.496	.609	.664	.697	.721	.384	.325	.287	.260
Between inequality	.045	.058	.063	.065	.066	.032	.025	.020	.016
Within inequality	.451	.552	.601	.632	.655	.351	.300	.267	.243
Maximum between	.300	.367	.389	.398	.401	.234	.190	.159	.137
Ratio between	.150	.158	.161	.163	.164	.139	.130	.124	.119
Male	.493	.607	.661	.695	.719	.380	.322	.284	.257
Female	.530	.638	.687	.716	.735	.421	.361	.321	.293
Total inequality	.496	.609	.664	.697	.721	.384	.325	.287	.260
Between inequality	.006	.007	.006	.006	.006	.006	.006	.006	.006
Within inequality	.490	.603	.657	.691	.714	.377	.319	.281	.254
Maximum between	.110	.109	.106	.103	.101	.112	.111	.109	.106
Ratio between	.058	.060	.061	.062	.063	.057	.056	.056	.056
Illiterate	.472	.590	.646	.680	.703	.355	.293	.253	.225
Primary	.457	.570	.626	.662	.688	.343	.287	.251	.226
Secondary	.467	.577	.630	.664	.687	.357	.301	.265	.239
Bachelor or University	.497	.614	.670	.705	.728	.379	.317	.277	.249
Total inequality	.496	.609	.664	.697	.721	.384	.325	.287	.260
Between inequality	.098	.110	.115	.117	.118	.081	.071	.064	.059
Within inequality	.398	.499	.548	.580	.603	.302	.254	.223	.201
Maximum between	.364	.434	.461	.474	.480	.294	.252	.223	.203
Ratio between	.269	.255	.250	.247	.245	.276	.284	.288	.290

Note: Region 1=Amman, Balqa, Zarqa, Madaba; Region 2=Irbid, Mafraq, Jarash, Ajloun