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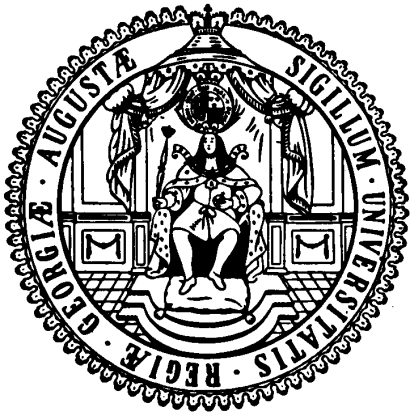

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UNDP's Gender-related measures: Current problems and proposals for fixing them

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UNDP's Gender-related measures: Current problems and proposals for fixing them

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February 2017

Abstract

In contrast to UNDP's wildly successful Human Development Index (HDI), UNDP's gender-related indices have had a rather rocky history. To this day, the Human Development Report Office (HDRO) has not produced a measure that has met the requirements of policy-makers, academics and development practitioners for a transparent, clear, well-measured internationally comparable index that can be used to compare countries across the world with regard to the extent of gender inequalities in human development-related dimensions. As a result, this void left by HDRO has been filled by many other indices of gender-related development that compare and rank countries. In this paper I will first briefly review the history of UNDP's gender-related indicators, discuss the Gender Inequality Index (GII), its most recent incarnation, in some more detail, briefly review other existing measures, before making concrete proposals for gender-related development measures that HDRO might want to consider. I will argue that the GII unfortunately has so many conceptual and empirical weaknesses and is far too complex a measure that it cannot really be considered an improvement over the problems associated with the previous two gender-related measures, the Gender-Related Development Index (GDI) and the Gender Empowerment Measure (GEM). I therefore propose that a better way forward would be a reformed GDI and GEM and I make specific proposals for indicators and illustrate the results of these proposals for levels and rankings of countries. Lastly, I will briefly present and discuss the new Gender Development Index created by the HDRO in the 2014 Human Development Report which is partly related to some of the recommendations made in this paper.

Keywords: Gender inequality, human development, UNDP, composite indices.

JEL Codes: I31, O15; J16

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1. Introduction and Main Findings

In contrast to UNDP's wildly successful HDI, UNDP's gender-related indices have had a rather rocky history. To this day, the Human Development Report Office (HDRO) has not produced a measure that has met the requirements of policy-makers, academics and development practitioners for a transparent, clear, well-measured internationally comparable index that can be used to compare countries across the world with regard to the extent of gender inequalities in human development-related dimensions. As a result, this void left by HDRO has been filled by many other indices of gender-related development that compare and rank countries. But although these alternative measures have received a considerable amount of attention, they suffer from their own problems, thereby still leaving an opportunity for HDRO to enter the fray with a gender-related measure that is simple and transparent, linked to its overall conception of human development, and able to provide meaningful inter-country-comparisons. In this paper I will first briefly review the history of UNDP's gender-related indicators, discuss the Gender Inequality Index (GII), its most recent incarnation, in some more detail, briefly review other existing measures, before making concrete proposals for gender-related development measures that HDRO might want to consider. I will argue that the GII unfortunately has so many conceptual and empirical weaknesses and is far too complex a measure that it cannot really be considered an improvement over the problems associated with the previous two gender-related measures, the Gender-Related Development Index (GDI) and the Gender Empowerment Measure (GEM). I therefore propose that a better way forward would be a reformed GDI and GEM and I make specific proposals for indicators and illustrate the results of these proposals for levels and rankings of countries. Lastly, I will briefly present and discuss the new Gender Development Index created by the HDRO in the 2014 Human Development Report which is partly related to some of the recommendations made in this paper.

2. A categorization of gender-related development measures

It may be useful to briefly categorize existing measures of gender-related development that have been proposed in recent years (see also Klasen and Schüler, 2011; Permanyer, 2010, 2012 for more extensive surveys). One way to categorize them is according to the aim of the index, i.e. what it is trying to measure. Three different approaches have been most prevalent. The first is to present a measure of gender-sensitive development, i.e. an indicator of overall human development adjusted by the welfare loss associated with gender inequality. UNDP's Gender-Related Development Index (GDI), introduced in 1995 and dropped in 2010, has been such a measure (see below). A second approach is to measure the welfare loss associated with gender inequality. UNDP's GII, introduced in 2010, falls into that category, as would be a measure that simply takes the difference or the ratios of the GDI and the HDI. A third approach is to simply aggregate gender gaps (expressed as differences or ratios) across different dimensions and thus try to measure 'average' gender inequality across a range of dimensions. The vast majority of indices that have been produced outside of UNDP basically follow that approach.

A second and orthogonal way to classify gender-related indices is to examine the dimensions they consider. First one could differentiate whether the index measures (well-being or empowerment) outcomes or focuses on rights and institutions. The latter has recently gained prominence with the publication of the CIRI rights-based measures as well as OECD's Social Institutions and Gender Index which measures gender gaps in social institutions in developing countries (see Branisa, Klasen, Ziegler, Drechsler and Jütting, 2014, as well as Branisa, Klasen, and Ziegler, 2013 for a detailed discussion of these measures). But, in the spirit of UNDP's outcome-focused approach to measuring development, I will only focus on outcome-based approaches. Among them, one can distinguish between indicators focusing on gender inequality in well-being, gender inequality in empowerment, or hybrid approaches that try to measure both aspects.

Table 1: Categorizing Gender-Related Development Indices

	Gender-Sensitive	Welfare Loss of Gender inequality	Average Gender Gap
Well-being	UNDP's GDI	GDI/HDI, HDI-GDI	Djikstra's RSW, Klasen/Schüler's GGM, Permanyer's GR New 2014 GDI
Empowerment		UNDP's GEM (?)	Klasen/Schüler's GEM3
Hybrid		UNDP's GII	Social Watch's GEI, World Economic Forum's GGI, Djikstra's SIGE, UNECA's AGDI

Note: RSW refer to Relative Status of Women, SIGE Standardized Index of Gender Inequality, GGI to Gender Gap Index and AGDI to African Gender and Development Index, GEI to Gender Equity Index, GGM to Gender Gap Measure. For a detailed discussion, see Klasen and Schüler (2011) and Permanyer (2012).

The distinction between well-being and empowerment (agency) is particularly pertinent when studying the issue of gender inequality. As has been discussed in detail by Amartya Sen (e.g. Sen, 1998), well-being and agency concerns can be quite different and need to be considered separately. First off, both are intrinsically valuable but do not necessarily go together. There are many countries in the world where female well-being is quite high, but their agency is severely compromised (e.g. Asian countries such as South Korea, Japan, many Latin American countries, some Middle Eastern countries).[2] Mixing these two issues implies trade-offs between well-being and empowerment which is problematic, and makes interpretation difficult. Second, the link between female empowerment and female well-being differs across countries and circumstances. As has been shown again by Sen (1998), it may be the case that women are the 'agents' of their poor well-being outcomes when they appear to 'consent' to granting greater resource access to their male partners and their male children. Conversely, in some contexts female empowerment improves female well-being (and often overall well-being, see World Bank, 2001). This again argues for measuring female well-being directly, and to separate it from empowerment concerns.

3. Some general issues regarding multidimensional indices of gender inequality

Producing composite indices of anything, compared to simply using individual indicators to compare gender inequality in different dimensions, always carries a set of conceptual and empirical advantages and disadvantages. This is not the place to discuss these issues in general. Clearly UNDP has opted for composite indices some time ago, largely on strategic ground, and this decision has a lot of merit, as the successful reception of the HDI shows. But there are a few issues that are of particular pertinence when considering gender-related composite indicators which I want to briefly discuss. The first issue relates to individual versus household-level indicators. Since men and women live together in households, household-level indicators such as household income or access to services, cannot say much about the intra-household distribution of these benefits (Klasen, 2007). This poses particular challenges for income or consumption-based indicators whose intrahousehold distribution cannot easily be determined (Klasen, 2007). Individual-level indicators do not suffer from this disadvantage although also here it may

[2] For example, South Korea scores very high on UNDP's GII despite its rather poor record of female empowerment (and driven mostly by high absolute levels of female well-being).

be the case that there are household-level externalities that need to be considered.[3] Related to this are difficult measurement issues concerning household production and women's and men's labour outside of recorded SNA activities. Many women are producing services in households (particularly care and household maintenance) that are not included as SNA activities and are difficult to measure (UNDP, 1995). While time use surveys can document the labor input into these efforts, valuing these efforts is very difficult from either a well-being or an empowerment perspective (OECD, 1995). As a result, one is often forced to rely on including just women's SNA activities in assessments of gender gaps which is a serious limitation that cannot, however, easily be addressed.

Second, the issue of allowing for compensation of disadvantages between dimensions is particularly pertinent in the field of gender-related composite indicators. In many countries gender gaps differ greatly by dimension. To what extent should indicators of gender-related development allow for compensation between these dimensions? Should there be full compensation (as in the case where the composite index is merely an average of female-male ratios?), should there be partial compensation (as in OECD's SIGI measure, see Branisa et al. 2014), and should the advantages cumulate (as in UNDP's GDI and GEM)? Closely related to this is the question of how to deal with gender gaps going in opposite directions in a country. In a large number of countries, gender gaps in years of schooling and enrolment rates now favor females while they remain nearly universally disadvantaged in labor market opportunities (see Klasen, 2006; Klasen and Schüler, 2011). Should one again allow for compensation, partial compensation, or compound these gaps even if they favor different sexes? The indicators used in the literature all take a position on these issues which is an important criteria for assessing them.[4]

4. A Short Review of UNDP's and other Indicators of Gender-Related development (pre-GII)

After the first Human Development Report in 1990 (including the first HDI), the 1995 report then introduced two measures of gender-related development. When proposing the two gender-related indicators, the UNDP made two important decisions. The first was to separate gender-related human development from empowerment and relegate them to two separate measures, the GDI and GEM, respectively. This was following the arguments proposed above that the two issues are separate and separately intrinsically valuable. And the second was, in the case of the GDI, to refrain from proposing an index of gender inequality in well-being but instead propose a measure that would track overall human development and include a penalty for gender gaps in human development, that is, a gender-sensitive measure of human development. Anand and Sen (1995) developed the conceptual framework of the GDI which consider intergroup inequalities by gender in an overall assessment of well-being. The idea is to apply a 'penalty' to the HDI value if gender inequality exists in any of the three dimensions included in the HDI using the approach used by Atkinson (1970) in his famous paper on the measurement of inequality. The larger the gap between men and women in achievements of life expectancy, education, and earned income, the more the GDI differs from the HDI. The gap between the HDI and GDI therefore depends on the differences in achievements between men and women in one of the components of the HDI and on the penalty given to this gender inequality. The GDI is therefore a measure of gender-sensitive development, to be interpreted as the HDI discounted for gender disparities in its components. Therefore it should not be used independently of the HDI; in particular, it cannot be understood on its own as an indicator of gender gaps in well-being or the welfare losses of gender inequality. The gap between HDI and GDI (difference or ratio) can, however, be seen as the loss of human development due to gender inequality. To compute the GDI, we first calculate indicators of achievement for men and

[33] For example, for this reason the MPI assumes that a household is not deprived in the dimension education if a single member has more than 5 years of education.

[4] See also Klasen and Schüler (2011) and Peramnyer (2010, 2012) for a more in-depth discussion of these issues.

women separately. Second, based on Atkinson's (1970) way of incorporating aversion to inequality, we determine the "equally distributed index" for each component of the HDI as follows:

> Equally Distributed Index = {[female population share(female index$^{1-\varepsilon}$)] + [male population share(male index$^{1-\varepsilon}$)]}$^{1/1-\varepsilon}$

If ε is equal to zero, this equation uses the simple arithmetic mean of female and male achievements. The Human Development Report adopts an ε of 2 assuming quite a strong social preference for equality (see Grün and Klasen [2008] Klasen [2008] for a review of the empirical literature on inequality aversion).

Early critiques by Bardhan and Klasen (1999, 2000), Dijkstra and Hanmer (2000), and Dijkstra (2002) as well as the review of the GDI in 2005-6 brought out a number of weaknesses, which Dijkstra (2006), Klasen (2006b), and Schüler (2006), among others, summarize. On the practical side, the most important problem appeared to be that the GDI was often misunderstood and misinterpreted as a direct measure of gender inequality (Klasen 2006a; Schüler 2006). As just shown, this assumption is incorrect as the GDI merely adjusts the HDI by a welfare penalty for gender inequality and thus is a gender-inequality adjusted measure of overall human development. Moreover, many of the above-mentioned reviews saw severe conceptual and empirical problems with the earned income component, which accounts by far for the largest difference between the HDI and the GDI and is based on earned incomes of men and women. In particular, it is implausible to accept that gender gaps in earned incomes are very good proxies for gender gaps in consumption at the household level since resources are, at least to some extent, shared at the household level (Bardhan and Klasen 1999; Klasen 2006b).[5]

Moreover, the empirical assumptions for deriving earned income shares rely heavily on labor force participation data and gender differentials in earnings in the non-agricultural sector. The labor force participation data are not very unreliable and difficult to compare, and the earnings data are patchy (and thus often estimated) and come from sectors that represent a small fraction of the working population in many developing countries. As a result, they have a very weak empirical base and cannot really be seen as a good representation of earned incomes (Bardhan and Klasen 1999, 2000). Thus the most important difference between the HDI and the GDI, and thus of UNDP's assessment of the welfare penalty of gender inequality, is conceptually and empirically deeply problematic.[6]

Another conceptual problem is that the procedure to adjust the HDI for gender inequality compounds penalties for gender inequality in different dimensions even if the inequality hurts women in one dimension and men in another. Thus a country with gaps harming women in all three dimensions is treated the same as a country where equal sized gaps impact women negatively in some dimensions and men in others, which seems problematic. As is shown in Klasen (2006b), this affects the results for many countries where women are advantaged in the life expectancy component but disadvantaged in the education and earned income component.

These conceptual and empirical difficulties, as well as the frequent confusion about and misunderstandings of the GDI, have led to a number of gender-inequality measures that try to fill the apparent demand for a reliable and comparable measure of gender inequality in well-being outcomes

[5] While it is likely that women with low earned incomes, relative to men, might suffer from inequalities in access to resources within the household, it is patently false to assume that a woman who earns no income at all therefore has no access to resources for human development such as nutrition, clothing, and housing. See Klasen (2006a) and Klasen (2007) for a fuller discussion of these issues.

[6] Unfortunately, there are no obvious ways of fixing the empirical problem and estimating 'true' male and female consumption shares. This is due to fact that income is shared at the household level and a significant share of income is then devoted to household-specific public goods (such as housing, durable goods, etc.) whose use cannot be ascribed to individual members. See Klasen (2007) for a full discussion of these issues. This also means that claims about the share of males and females among the income poor are not based on sound analysis.

(for example, see Dijkstra [2002]; United Nations Economic Commission for Africa [UNECA; 2004]; Social Watch [2005]; World Economic Forum [2005]; Organisation for Economic Co-operation and Development [OECD] 2009); Klasen and Schüler (2011); Permanyer (2010, 2012).

Others have created a new composite measure of gender inequality that draws on components related to the HDR. For example, Dijkstra and Hanmer (2000) construct the Relative Status of Women Index (RSW), which uses the same indicators as the GDI. The RSW is calculated as follows:

$$RSW = \frac{1}{3}\left(\frac{E_f}{E_m} + \frac{L_f}{L_m} + \frac{w_f}{w_m}\right)$$

where E_f and E_m are male and female educational attainment indexes, L_f and L_m are the male and female life expectancy index, and w_f and w_m are the male and female rate of return to labor time or, equivalently, the ratio of female earned incomes to their population share. The indices for men and women are calculated in exactly the same way as they are for the GDI. Their advantage over the GDI is that these are clear, transparent, and intuitively appealing direct measures of gender inequality. While we propose something related, we want to point to two problems with this measure for which we adjust. The first is that, as already discussed, the quality of data on gender gaps in earnings is very poor and indeed is one of the problems associated with the earned income component of the GDI. The second issue is that taking an arithmetic mean of ratios has some problematic properties. In particular, doing twice as well in one component (that is, with the ratio being 2) more than compensates for doing half as well in another component (that is, with the ratio being .5), clearly a counterintuitive result.

Dijkstra (2002) additionally proposed the closely related Standardized Index of Gender Equality (SIGE) with the aim of avoiding some of the methodological limitations of GDI and GEM. The SIGE consists of five indicators: educational attainment, life expectancy, labor market participation, share in higher labor market occupations/positions, and share in parliament. Thus it constitutes a combination of components, including both well-being and empowerment indicators, in contrast to the separation of these two issues in the UNDP's measures. Indicators are defined as the relative achievement of women to men for the first three indicators and as the share of women for the last two. For each country and indicator, the resulting score is standardized by expressing the score as the distance (in standard deviations) from the mean of scores of all countries. The index is a simple arithmetic average of the standardized scores.

While Dijkstra (2002)'s proposals are interesting and useful, we propose some modifications here. As discussed above, there is value in separating well-being from empowerment measures, and thus we keep these two issues separate. Also, Dijkstra (2002)'s standardization ensures that the score of a country depends on the scores of all other countries in a particular year (as well as the sample of included and excluded countries), generating problems of comparability over time and making the measure much less transparent.

Social Watch (2005) developed the Gender Equity Index (GEI) as another direct measure of gender equality. The index has three dimensions with several indicators in each: education, economic participation, and empowerment. The GEI assesses equity in the education as the female-to-male ratio in literacy rates, and in enrollment rates at the primary, secondary, and tertiary level. For economic participation, the GEI uses the percentage of women in total paid jobs (excluding the agricultural sector) and the ratio of female income to male income. The GEI measures empowerment by the percentage of women in high administrative and management positions, in parliament, and in decision-making posts at the ministerial level. The GEI is the simple average of the indicators for the three dimensions. However, this index mixes well-being with empowerment issues; it is based on shaky income data; is complex and

lacks transparency due to its use of many subcomponents; and suffers from the problem of using an arithmetic mean of ratios.

In 2006 the World Economic Forum introduced another index that focused on outcome variables: the Global Gender Gap Index (GGI). The GGI includes the following dimensions: economic participation and opportunity, educational attainment, political empowerment, and health and survival. Within each of these components, there are several indicators so that in the end, fourteen indicators are used. The overall index in each category is calculated by converting the data into female-to-male ratios. Furthermore, all sub-indices with values higher than 1 are truncated at 1, except for the life expectancy sub-index, which is truncated at 1.06. Thus countries that have reached perfect equality are treated the same way as countries where men have lower human development than women. In order to ensure that each component of the educational sub-index, for example, has the same relative impact on the sub-index score, the GGI computes a weighted average. A simple average would give more weight to the component with the higher standard deviation. Weights are determined by calculating the standard deviation per one percentage point change of each component and then translating these values into weights. Therefore a country with a large gender gap in primary enrollment (low standard deviation) is penalized more than a country with a large gender gap in tertiary enrollment (high standard deviation). The GGI is then the simple average of all four sub-indices. This measure also mixes well-being and empowerment issues, and the large number of components and the complex weighting procedure generates problems of interpretability and comparability over time.

UNECA (2004) developed the African Gender and Development Index (AGDI), which includes several more categories compared to the above named indices, to assess the extent of inequality in well-being between men and women in African societies . ADGI consists of two parts, the Gender Status Index (GSI) and the African Women's Progress Scoreboard (AWPS). The GSI measures the achievement of women relative to that of men in three overall dimensions: social power, economic power, and political power. It then further divides these dimensions into several subcategories. First, the GSI assesses social power in the area of education and health, measuring educational achievements through enrollment rates, dropout rates, and literacy and health status in the area of child health through indicators for stunted growth, low weight, and under-five mortality. For adults, the health subcategory includes the following indicators: life expectancy at birth, new HIV infections, and time spent out of work. Second, the GSI measures economic power through wages and other income, time-use, employment, employment in management, and access to resources. Here resources mean access to houses, land, and credit, and the GSI includes a measure of the freedom to dispose of one's own income as well. Third, the GSI measures political power by employment in the public sector and activities in civil society, like political parties or NGOs. The GSI calculates the relative achievement of women compared to men for each category. These calculations are combined through a simple average without the inclusion of population weights.

AWPS assesses governments' progress in ratifying conventions regarding women's equal treatment and empowerment. It scores governments on a scale of 0 to 2, assigning a 2 to a country if an adequate budget or a law or policy commitment has been passed by the government. AWPS is measured in percentages set to the maximum possible score. AWPS piloted these indices for twelve Sub-Saharan African countries. While they are clearly useful in providing a comprehensive set of data on gender gaps in many dimensions, the combination of these many components into two indices leads to measures that are hard to interpret and difficult to communicate. Also, data quality issues will preclude timely and reliable publication for a large set of countries over time.

All of the gender inequality indicators just discussed implied full compensation between different dimensions of gender inequality. They differ in this way substantially from UNDP's approach where different gender inequalities are compounded.

As already discussed, some of the measures just discussed already consider empowerment. UNDP's GEM is specifically focused on determining women's relative empowerment, which we consider to be a valuable feature of the measure. GEM contains three components: political representation, representation in senior positions in the economy, and power over economic resources (proxied by earned incomes). Similar to the GDI, it uses the same aversion to inequality procedures that penalizes inequalities in political and economic representation as well as earned incomes. But there are a range of problems associated with the current GEM, which Klasen (2006b) discusses in detail. The first is that the earned income component considers female and male earned income *levels* as directly relevant for empowerment and only then "penalizes" inequality between them using the Equally Distributed Equivalent Percentage procedure similar to the one the GDI also uses.[7] It therefore does not limit itself to measuring the gender gaps in earned incomes as the main issue in female empowerment. As a result, poor countries with low male and female income *levels* can never score high on this component, even if there is no gender inequality in these earned incomes. This seems inconsistent with the other two components (which only consider women's relative representation in politics and the economy) and also somewhat counterintuitive as relative earnings (rather than absolute levels) should be the only relevant information for women's relative empowerment. A second problem is that the complicated aversion to inequality procedures (adopted from the GDI) used to penalize deviations from equal representation in politics and senior economic positions seems redundant in this indicator since the gaps could be considered directly.[8] Lastly, again gender gaps are compounded in the 'penalty for inequality' even if they go in different directions. If a country has large gender gaps hurting females in parliamentary representation, but large gender gaps favoring females in participation in professional and technical workers, such a country will be treated the same as one where females are disadvantaged in both dimensions. Since this is not only a theoretical possibility but an empirical reality in a number of countries, this is another problem of this measure.

Three points become apparent in this review of existing measures. First, UNDP's initial way to frame the issues has suffered from conceptual and empirical weaknesses of the two particular indicators chosen. As a result these measures have not been very successful in the policy arena, also related to the difficulty to communicate them effectively (which was a particular challenge for the GDI). Second, the void has been filled by a plethora of other gender-related development indicators that try to capture different aspect of gender-related development. As the brief review shows, however, these measures, although easier to communicate, have their own short-comings. They typically have too many dimensions and indicators, mix well-being and empowerment, and the resulting rankings and index values are hard to interpret. Therefore, thirdly, there remains room for clear, transparent measures of gender-related development that correct the defects of UNDP's previous measures while building on their strengths.

In this vein, Klasen (2006b) and Klasen and Schüler (2011) proposed ways to reform UNDP's two gender-related indices in the following way. First, they proposed, following the discussion above, to

[7] The only difference is that the GDI uses the log of income levels, while the GEM uses the income levels themselves.

[8] There is an additional computational issue that needs to be raised. Due to the way the GEM is calculated which considers the population shares of males and females relative to their shares in employment and parliamentary representation, another mathematical problem appears. If the female share of parliamentary representation or economic participation is above 50% but below the female population share (and thus women continue to be under-represented), the component for parliamentary representation or economic participation is actually above 1, clearly an undesirable feature (which occurs, however, only rarely and does not greatly affect the rankings). Our alternatives proposed below deal with this issue. We want to thank Karina Trommlerova for pointing out this inconsistency to us.

keep the distinction between well-being and empowerment measures as two distinct issues that can and should be analyzed separately. Regarding the GDI, they proposed two general approaches. One was to produce a male and female Human Development Index which would immediately make the gender gaps in human development visible. AS discussed below, this approach has been taken up by HDRO in the 2014 Human Development Report where a new Gender Development Index (GDI) is introducted which is simply the ratio of a female human development index to the male human development index. One problem with that approach is, however, that it would still be reliant on the problematic assumption that differences in earned incomes equal differences in access to consumption. Therefore their main proposal regarding the GDI was to make it a direct gender inequality measure which they called the Gender Gap Measure (GGM) which is simply the geometric mean of the female-male ratios of life expectancy, education, and labor force participation rates, i.e. the GGM is defined as

$$GGM = \left(\frac{LE_f}{LE_M} \times \frac{ED_F}{ED_M} \times \frac{LF_F}{LF_M}\right)^{\frac{1}{3}}$$

where LE, ED, and LF are the life expectancy index adjusted for a assumed 5 year female longevity advantage[9], the education index, and labor force participation rates of women and men, respectively.[10] This measure would squarely fall into the cell of gender inequality measures focusing on well-being dimensions. It would allow for full compensation of advantages and disadvantages across dimensions. Its advantage to the competing gender inequality measures discussed above would be its close relationship and link to overall human development context, its simplicity and ease of interpretation, and its focus on well-being.

Table 2 shows the results for the GDI (drawn from the 2006 report and thus based on the year 2004), the female and male HDI, the ratio of the female-to-male HDI (which now has become the new GDI in the 2014 Human Development Report)[11] as well as two versions of the GGI, one without capping the components at 1 and the other one capping them at 1. For each of those options, associated rankings are produced.[12]

As is well known, the Scandinavian countries top the list in the GDI, while the bottom thirty countries on the list are from Sub-Saharan Africa. When analyzing the male and female HDI, we see significant differences between the male and female HDI. This is particularly the case in countries lower down on the list where the female HDI is up to 35 percent smaller than the male HDI. Overall, the female HDI is about 8 percent lower than the male HDI, with rather small gaps in industrialized countries.[13]

Compared to the GDI, some rankings do change when the female HDI is examined separately. Among the countries gaining in rank when the female HDI is considered are Luxembourg, Finland, France, many transition countries, and a few countries in Sub-Saharan Africa (including Rwanda, Zimbabwe, and Lesotho). Among those losing positions are Ireland, the Netherlands, Switzerland, Japan,

[9] The life expectancy index this is calculated for males: (LEm-22.5)/60 and for females: (LEf-27.5)/60. For education it is simply the weighted average of literacy and enrolment rates.

[10] See Permanyer (2010) for a closely related indicator, called GRS1.

[11] As the information in Table 2 is based on the old formulation of the HDI (including, for example, enrolment and literacy rates, and using an arithmetic mean for creating the index), it is not directly comparable to the GDI created by UNDP in the 2014 Human Development Report.

[12] As the indicators included in the GDI, GEM, and GGM change relatively slowly over time, the rankings shown here would hardly change if more recent or somewhat older data were used.

[13] These gaps are much larger than those between the HDI and the GDI, which are only about 1 percent on average. See Klasen (2006b) for a discussion.

many Middle Eastern countries, Bangladesh, and Pakistan. These rank changes appear quite plausible, given what is known about gender gaps in human development in the different regions.

Maybe more instructive than the ranking of the female HDI is the ratio of the female-to-male HDI (Table 2, column 5) and the ranking of the ratio of the female-to-male HDI (Table 2, column 7). In contrast to the GDI and the female HDI which measure gender-sensitive overall human development or female human development, respectively, this female-to-male HDI ratio can be interpreted as a measure of the gender gap in human development. Also note that with this ratio, advantages in one dimension can compensate for disadvantages in another. For example higher female than male education in a country can boost the female HDI and make up for low earned incomes of women that would otherwise decrease the female HDI. Lastly, the ratio directly measures the gaps in human development and not the gaps are typically much larger than their implied welfare penalty. We suggest that these are all desirable features of the ratio of the female-to-male HDI (see also discussion below).

Given the differences, it is therefore no surprise that the rankings change dramatically in the countries that have ratios above 1, with Russia getting the first spot, followed by Latvia, Lithuania, Estonia, and Belarus. Scandinavian and other industrialized countries occupy the next twenty to thirty ranks but all have lowered significantly in rank. Ireland stands out as the biggest drop off in terms of rank: it loses forty positions relative to the female HDI, and forty-six spots relative to the GDI (due largely to its low performance in female earned incomes). The reasons for the particularly high ratios in transition countries is related to very low gaps in earned incomes, hardly any gaps (or even gaps favoring women) in education, and large survival advantages for women relative to men. The last point suggests more male disadvantage than female advantage, and therefore a value of the female to male HDI above 1 should not necessarily be seen as desirable, while a ratio very close to one should be seen as best. As shown in Table 2, the top fifty countries have ratios quite close to 1, suggesting relatively small gender gaps or similar gaps going in different directions. The fact that it is difficult to distinguish between these two issues (small gaps versus gaps going in different directions) is a weakness of this measure as well as the GGM (see discussion below); by studying the ratio of the different components (e.g. the ratio of the female to male life expectancy component), one can, however, readily see whether the good performance is due to small gaps or ratios above 1 in a component compensating for ratios below 1 in another.

There is also the issue whether one should rank countries that have a female-male HDI ratio of above 1 in descending order (as done in Table 2). One may argue that the ideal position is exactly 1 and any deviation from 1 is a departure from gender equity in human development. This is the position taken by UNDP in the 2014 Human Development Report with their new GDI (which the ratio of the female-to-male HDI, see below).

We should also point out that the very good performance in transition countries is, to a considerable extent, still a legacy of socialism which invested heavily in female education and employment. While parity (or even female advantage) in education levels has persisted in the transition phase, women's employment opportunities have suffered in many transition countries so that future trends in the ratio of the female-to-male HDI could be negative (for an early discussion of this issue, see Klasen (1993)).

Further down the list, there are also dramatic rank changes. Particularly noticeable is that Lesotho, which ranks 113 in the GDI and 104 in the female HDI, now comes in at thirty-eight in the ratio of the female-to-male HDI. This is largely due to the fact that women have higher literacy rates and slightly higher enrollment rates (and, when using the new education component of the HDI, higher years of schooling and expected yers of schooling) than men which largely make up for existing gender gaps

hurting women in earned incomes and life expectancy. Rwanda (which incidentally is the top performer in Social Watch's GEI), Kenya, and Madagascar similarly have considerably improved ranks (though not as strong as Lesotho).

Among those whose rank in the female to male HDI decreases the most are many Middle Eastern countries (such as, Kuwait, Bahrain, United Arab Emirates, and Saudi Arabia) and, to a lesser extent, Latin American countries (including Mexico, Chile, Costa Rica, and others) and South Asian countries (India, Pakistan, and Nepal). The reason is that in these countries the substantial female disadvantage in earned incomes (compounded by female disadvantages in education in many countries) figures much larger as we now consider these gaps directly (rather than the welfare penalty attributed to them). Also, since the women are disadvantaged in all components in these countries, they fare much worse relative to those where gaps favor women in one and men in another dimension.[14]

We suggest these findings are all sensible, and given its transparency and conceptual advantages, the ratio of the female-to-male HDI seems to yield important new insights about gender gaps in human development that are well worth publishing on a regular basis. But, the ratio should not be the only measure of gender gaps in well-being as it remains affected by the conceptually and empirically problematic earned income component.

Column 8 in Table 2 shows the (uncapped) GGM, and the next column reports the GGM ranking . Since data on labor force participation rates are more widely available than on earned incomes, it is possible to calculate the GGM for thirteen more countries, which is very useful and a definite advantage over the GDI. Interestingly, these results are relatively close to the ratio of the female-to-male HDI, suggesting that these two ways of calculating gender gaps in human development yield rather similar results.[15] Once again, transition countries top the list (Kazakhstan now ranks first) followed by other industrialized countries; Ireland is only ranked fifty-one and has the biggest drop in rank, compared to its position in the GDI.[16] Further down on the list, quite a number of Sub-Saharan African countries have much greater gender equity than suggested by the GDI. They not only include Lesotho and Rwanda, but Burundi, Mozambique, Tanzania, and Madagascar. This is due to the relatively high female labor force participation rates in these countries, as well as comparatively small gender gaps in education favoring men. Conversely, Middle Eastern, Latin American, and South Asian countries drop dramatically in ranking. Most noticeable is the fall of over eights ranks of Bahrain (Oman), from rank thirty-eight (fifty-

[14] Remember that in the GDI, gaps going in opposite directions are compounded just as much as gaps going in the same direction. With the ratio of the female-to-male HDI, this is not the case, because it only compounds countries with gaps in the same direction, which is another reason for the low rank of these countries.

[15] They are not identical though. For example, Lesotho, Rwanda, and Madagascar, each appear very low in the GDI, but they fare quite differently in the ratio of the female-to-male HDI and the GGM. Lesotho increases its rank the most in the ratio of female-to-male HDI and falls back in the GGM, while Madagascar and Rwanda rank higher in the GGM. Brazil and Botswana are two more countries whose ranks increase substantially in the ratio of the female-to-male HDI (compared to the GDI) but fall back again in the GGM; in these cases as in Lesotho's, the relatively high inequality in labor force participation now weighs relatively more heavily in the GGM than in the ratio of the female-to-male HDI, leading to this change. This is also the reason for further substantial rank losses in the GGM for many Middle Eastern countries and countries such as Italy, Greece, and Malta.

[16] Particularly noticeable is the relatively low position of Luxembourg in the GGM, which only occupies rank fifty-six, despite faring much better in the GDI, the female HDI, and the ratio of the female-to-male HDI. This difference is due to a particularity in Luxembourg's case. Because of its very high prosperity, male and female earned incomes reach the maximum of US$40,000, so the earned income index is capped at 1 for both, (erroneously) suggesting perfect equality between the sexes. The GGM, however, considers existing gaps in labor force participation, and thus Luxembourg drops considerably in rank.

eight) in the GDI to rank 122 (139) in the GGM. At the bottom of the list in terms of the GGM is now Afghanistan, preceded by Yemen.

Similar to the ratio of the female to male HDI, the GGM also suffers from the problem that one cannot readily distinguish between good performance due to low gaps in all three dimensions or due to gaps favoring males in one dimension and females in another that are averaged out. One possible solution would be to present a second measure where the female-male ratios would be capped at 1. In this measure, countries with gaps going in different directions would score worse relative to countries with gender balance in all three components and this would help interpret the results.[17]

The last two columns show values and ranks of the GGM if the components are capped at 1. This has a significant impact on values and ranks in the upper part of the table where most countries with components above 1 are concentrated. While transition countries continue to fare well (Lithuania now gets the top spot), they mostly declined in the ranks. Nordic countries instead make up three of the top five countries (with the remaining two in the top ten). This suggests a more balanced equality in Nordic countries, in contrast to the transition countries where female advantage in mortality (and in education in some countries) was heavily influencing the results. Transition countries and industrialized countries make up the next thirty to forty spots. Further down the list, the changes in rank are very small (see Table 4 below as well).

To conclude, the newly calculated male and female HDI, the ratio of the female-to-male HDI, and the GGM give new important insights into gender gaps in human development, and it would be well worth replacing the current GDI with some or all of these measures. In particular, they drastically revise our view of gender inequality in well-being in transition countries, the Middle East, and many Sub-Saharan African countries. As far as the GGM is concerned, maybe the capped version (or showing both capped and uncapped versions) is to be preferred as it rewards balanced equality in all components. Otherwise the ranking is heavily influenced by the male disadvantage in mortality in transition countries, which is an undesirable feature of this measure.

Regarding empowerment, Klasen and Schüler (2011) proposed a revision of the GEM to deal with the problematic use of income levels (and use income shares instead) and also turn that into a straight-forward gender inequality indicator consisting of a geometric mean of ratios. The revised equation is:

$$GEM3 = \left(\frac{PR_f}{PR_M} \times \frac{EP_F}{EP_M} \times \frac{IS_F}{IS_M}\right)^{\frac{1}{3}}$$

where PR, EP, and IS refers to parliamentary representation, economic participation in leadership positions, and income shares, respectively.[18] The measure would again, in the characterization of Table 1, be a gender gap measure, this time focusing on empowerment. By focusing on relative achievements in economic and political participation, it is now more clearly a measure of relative empowerment. But

[17] One could, of course, also focus on indicators where the empirical evidence of male disadvantage is low and thus where the problem would not arise empirically. Of course, there are arguments against capping. In particular one simply disregards gender gaps hurting men which might be seen as a problem, particularly if the focus is on gender (rather than on the position of females).

[18] One may wonder why the proposed GEM continues to use the problematic income shares rather than shares in labor force participation as proposed for the GGM. The reason is that, as already suggested in Bardhan and Klasen (1999), the income component in the GEM is (conceptually) less problematic than in the GDI. While it is highly implausible that women with zero earned income have no access to food, shelter, clothing, and other valuable functionings (as the GDI implies), it is plausible that women with no earned income have little or no control over economic resources and are thus disempowered in this way (see World Bank 2001)

of course, it also has some drawbacks. To the extent that, for example, female participation in the labor force is driven by distress of poor women to work in difficult and hazardous jobs, it is not so clear that is invariably an indicator of empowerment.[19] Moreover, female participation in national parliaments may not reflect broader political empowerment (see Klasen 2006b for a discussion).

A complication arises that the reported underlying data for these indicators are the share of women in parliament and economic leadership, and with high incomes. These shares are, as discussed in Klasen (2006b), also dependent on population share of men and women. For example, in a country where women make up 55 percent of the population, equality should mean 55 percent of parliamentary representation (and not 50 percent). To account for this in the case of parliamentary representation, for example, the first component of GEM3 is calculated as follows:

$$\frac{PR_f}{PR_m} = \frac{\frac{FSPA}{FSPOP}}{\frac{MSPA}{MSPOP}}$$

Where FSPA, FSPOP, MSPA, MSPOP are the female share of members of parliament, the female population share, the male share of members of parliament, and the male population share. We make equivalent calculations for the other two components.

Table 3 shows the results for GEM as calculated by the UNDP and our two revised versions of the GEM (GEM2 and GEM3) together with associated rankings. GEM2 uses income shares but retains all other features of UNDP's GEM while GEM3 follows the formula presented above. One weakness of the GEM is unfortunately also apparent for all three formulations. It is available only for seventy-five countries, thus fewer than half of the countries in the world. This remains a serious problem of this measure.

When comparing the GEM2 (with income shares rather than levels; Table 3, columns 3 and 4) to the UNDP's GEM (Table 3, columns 1 and 2), a number of important differences appear. While the two are generally closely correlated and there are relatively only a few changes at the very top and the very bottom of the ranking, significant changes do occur. Four countries lose more than twenty ranks (The US, Ireland, Italy, and Japan), while two countries gain more than twenty ranks (Moldova and Tanzania). The single largest improvement in ranking is Tanzania which jumps from rank thirty-seven to rank eight. The US, Japan, Ireland, and Italy fall in the ranks due to very low parliamentary representation in these four countries, which are no longer papered over by high income levels (as in the UNDP's GEM). Conversely, relatively poor countries where women are broadly represented in politics and the economy and have relatively high earning shares see an improvement in ranking. In the UNDP's GEM, these achievements are not visible due to the low income levels for men and women in these countries, showing that this undesirable feature really makes a difference.

When considering the GEM3 (the geometric mean of ratios of empowerment achievements) in columns 5 and 6 of Table 3, the results are much more similar to GEM2 (with income shares) than to GEM. Again there are not many changes at the bottom of the list. Do note that Saudi Arabia and the UAE now have a GEM3 of 0 due to the absence of any female representation in parliament, but the impact on their very poor ranking is minor. At the top, Ireland, the US, Greece, Italy, and Japan again drop the most in rank, largely due to low parliamentary representation and somewhat smaller disadvantages in the other dimensions. Also, Tanzania again has one of the biggest increases in rank but is joined by Moldova

[19] See Klasen and Pieters (2013) for the example of India where part of female participation in the labor force, particularly among less educated women, is distress driven.

and the Philippines. The latter two now fare much better as the female advantage in the representation among professional and technical workers can compensate for disadvantages in other dimensions.

To sum up, the results here suggest that both ways to correct for the problems of the GEM seem to lead to relatively similar results. Since GEM3 is the easier one to interpret among the two, it may be best to use as the central indicator of gender-related empowerment. The main argument against this is that this way of framing the index allows for fully compensating gender gaps in different dimensions, which some might see as problematic.

It was our argument in Klasen and Schüler (2011) that with GGM and GEM3, UNDP would have addresses the most serious weaknesses of its existing suite of measures, continued to distinguish between well-being and empowerment dimensions, retained its close linkage to its conception of human development, and created simple and easily interpretable measures of gender inequality in well-being and in empowerment.

5. UNDP's Gender Inequality Index

In the 2010 Human Development Report, UNDP decided to rework its gender-related indices and address some of the shortcomings that had been identified in the literature. As recommended by Klasen and Schüler (2011) and others, the GDI was dropped and also the GEM has been discontinued. Instead a new Gender Inequality Index (GII) has been created and calculated for 137 countries. The new GII contains three dimensions, reproductive health, empowerment, and labor market. The first averages female adolescent fertility and maternal mortality, the second parliamentary representation and educational attainment, and the third just consists of labor force participation. The aggregation is first across dimensions for males and females separately, using the geometric mean. Since the indicators of reproductive health only apply to women, for males a perfect score in reproductive health is assumed and used in the aggregation of geometric mean. In a next step, the aversion to inequality procedure (as in the GDI and GEM) is used to calculate welfare losses associated with the inequalities between males and females and the GII measures the welfare loss of these inequalities, relative to the achievements if perfect equality had persisted.

Some points are worth noting. In line with the characterization presented here, the GII is an index measuring the welfare loss of gender inequality considering a hybrid of well-being and empowerment outcomes rather than gender-sensitive development or gender inequality directly. In that sense, it is conceptually quite close to the ratio of the female to male HDI. Also the use of the geometric mean as well as of labor force participation data (rather than earned incomes) are in line with the recommendations made in some of the critiques of the GDI and GEM. But, in line with the discussion above, there are also some serious short-comings.

First, the index mixes well-being and empowerment issues which we argued to be somewhat problematic. Second, it mixes female achievements and female-male gaps. Any maternal mortality higher than ten per 100,000 live births are considered as nequality while in parliamentary representation only deviations from 50% are inequality. Of course, part of the high maternal mortality in developing countries surely relates to past and present unequal treatment of women, but a large part is also related to poor health services overall which affects males and females alike, but only affects women in terms of maternal mortality (see Klasen and Vollmer, 2014). This will, similarly to the GEM, erroneously imply that most poor countries are doing badly on gender, as they happen to have poor health care systems and great poverty leading to high rates of maternal mortality. Arguably one might suggest that, similarly, high adolescent fertility rates in poor countries can be as much poverty as gender inequality issues,

although surely a part of high teenage fertility will be related to child marriages and low value placed on adolescent girls. Since empirically the loss of gender inequality in the GII is mostly due to high rates of maternal mortality and adolescent fertility (UNDP, 2010), poor countries with low gender gaps in education or health access will still get a poor score and their efforts will go largely unrewarded.

Third, the index does not account for deviations in the female population share from 50%. This is most obviously a problem for the parliamentary representation measure, but can affect values and rankings for other components as well. Doing so might then generate the problems that plagued the GEM where it was possible for the index to exceed 1.

Fourth, the index is highly complex and involves a sequence of non-linear aggregation procedures that will make it very hard to communicate the index to policy-makers or to understand easily the drivers of the welfare loss due to gender inequality. The rather benign neglect with which the GII has been greeted since its inception demonstrates the difficulties with understanding and interpreting this measure.

Fifth, the alleged advantage of greater country coverage comes with a cost. Despite the fact the HDRO does not need to make any imputations, the data on maternal mortality are mostly imputed for developing countries where the database for accurate measurement of maternal mortality is simply lacking.[20] Thus an important driver of the GII is based on imputed data.

Lastly, the welfare loss of inequality is based on a calculated measure of gender equality that itself is reported nowhere; in that sense, the measure is worse than the GDI where one knew that the GDI with perfect equality is the HDI.

My summary assessment of the GII is that it is not an improvement at all and in fact represents a deterioration in many dimensions vis-à-vis the previous state of affairs, and certainly vis-à-vis reformed GDI and GEM measures discussed earlier. It mixes well-being and empowerment, levels of achievement and gender gaps, and is far too complex to be a usefully communicated and interpreted.

I do not really see an easy way to reform this index as the problems, as I see them, are rather fundamental. If one were to try to reform it, there are three directions in which one could go. One would be to separate well-being and empowerment concerns, focus the GII on well-being concerns and another index on empowerment. If one were to do that, it would be preferable to focus the well-being on indicators that are closely related to the HDI, i.e. life expectancy, schooling, and earnings (or labor force participation due the problems associated with earned incomes). A second approach would be to simplify the complex calculations. Here one might want to move from an indicator measuring the welfare loss of inequality to a gender gap measure. A third would be to use different indicators. In particular, the maternal mortality and the adolescent fertility indicators are problematic as they do not represent gaps. Replacing them with life expectancy might be the best way forward. But any of these changes would be so fundamental that it might be hard to say that it still is the same measure, presented in a reformed way. So maybe a more fundamental approach might be warranted.

Instead, my proposal would be to actually revert to the reformed GGM and GEM measures proposed by Klasen and Schüler (2011). They could be adjusted in a way to reflect the new ways to capture education in the Human Development Index used since 2010 and thus the GGM could consider gender gaps in years of schooling and expected years of schooling (rather than in adult literacy and enrolment rates). For the GEM, I would rely on the GEM3 version discussed above although it would be

[20] See, for example, Klasen and Vollmer (2012) for a discussion of this issue.

useful to find better indicators for economic participation of women that are currently limiting its country coverage.

In Table 4, I calculate UNDP's GII as well as the GGM using data for 2010; I show both the uncapped as well as the capped version (where each ratio is capped at 1) for reasons suggested above. The GGM differs from the formulation of Klasen and Schüler (2011) in that it uses total years of schooling (with 14 years as the maximum) and school life expectancy (with 20 as the maximum and capped beyond that) instead of adult literacy and enrolment rates. We also slightly modify the goalposts for life expectancy (from 32.5 to 82.5 for males and 37.5 to 87.5 for females) to reflect the range of observed data better. The use of school life expectancy reduces the comparison to just 104 countries from 138 countries for which the GII was available. This suggests that this indicator, which is a permutation of enrolment rates, has a large number of data gaps and the slight advantage of this indicator over enrolment rates might not be worth losing so many observations.[21]

The rankings are dramatically different between these two measures. While in the GII, the top ranked countries are Scandinavian countries, followed by South Korea and other European nations, with African and Asian countries populating the bottom of the ranks, in the GGM transition countries are topping the list, followed by Scandinavian and other European countries. Particularly noteworthy are individual rank changes. South Korea changes from rank 7 in the GII to rank 61 in the GGM, Russia rises from GII rank 41 to GGM rank 1, and also quite a number of African countries perform much better under the GGM (e.g. Tanzania moves up from 98 to 53, Rwanda from 66 to 33, Namibia from 74 to 46, etc). In contrast, Middle Eastern countries generally move down quite a lot in the GGM (e.g. Tunisia from 35 to 94, Turkey from 56 to 98, Morocco from 64 to 99, etc.). What is driving these drastic differences in rankings? Two issues are particularly important. First, in the GII poor countries have basically no chance of achieving a high ranking as their all-important maternal mortality rates and adolescent fertility rates are high. I argue that this is a problem of the index as this poor performance is often not mainly an issue of gender inequality but of poor overall economic and health conditions. In the GGM, quite a few poor countries do reasonably well if they are able to ensure low gender gaps in education, health, and economic participation.

Second, the GGM allows for full compensation between disadvantages across dimensions. As seen in the middle columns of Table 4 which shows the female-male ratios of life expectancy, education, and labor force participation, the reason the transition countries are topping the list in the GGM is that women enjoy a life expectancy advantage that is substantially larger than the presumed 5 years. In addition, they enjoy more education than their male counterparts, and the gaps in labor force participation are rather small. As a result, the GGM is actually above 1 suggesting that, on average, women's well-being, as measured by these indicators, is higher than that of males. Of course, one can express it the other way around as well. Men in transition countries suffer from very low life expectancy, compared to females, do worse in education, and only have a slight advantage in labor market participation. This is not to say, of course, that women in transition countries are in generally treated better than men, but that in these key aspects of human development, they appear to be favored.

This issue is addressed in the capped version of the GGM which is shown in the last two columns of Table 4. Now the transition countries no longer do quite as well, but they remain among the top performers; Moldova now is the top performer. Scandinavian countries occupy higher spots due to their greater balance in gender gaps across dimensions. Further down, the rankings hardly change. Using the capped

[21] In principle, one can calculate school life expectancy if one has enrolment rates. Thus it is unclear to me why the database provided to me by HDRO has fewer observations on school life expectancy than was previously available on enrolment rates; this remains to be explored.

version or presenting both might be the best way to address the problem of compensation between dimensions.

6. The New Gender Development Index (GDI)

In the 2014 Human Development Report, UNDP retained the GII but added a new Gender Development Index (GDI). Confusingly, this measures has the same acronym as the earlier Gender-Related Development Index (also GDI) which UNDP had reported between 1995 and 2010 and which I had discussed above. The New GDI is simply the ratio of a female HDI to a male HDI and thus takes up one of the suggestions made above. It is not exactly the same as proposed and illustrated in Table 2 as the HDI, upon which the new measure is based, has been changed in the meantime. In particular, in the education component, years of schooling and expected years of schooling replaced the old education indicators (literacy and enrolment which were still used in Table 2), and the aggregation shifted from an arithmetic to a geometric mean.

Despite these changes, the impact of the New GDI is remarkably similar to the ratio of the female-male HDI shown in Table 2, suggesting both a stability of the impact over time (Table 2 is based on 2004, while the new GDI is calculated for 2012) as well as a relatively small impact of these methodological changes. In particular, the highest values for the GDI are found in the transition countries of Eastern Europe, followed by Scandinavian countries, other OECD countries, with countries such as Pakistan and Yemen at the bottom of the list, with particularly large gender gaps.

Despite these similarities in values, rankings differ more substantially between the female-male HDI ratio in Table and the New GDI. This is due to the fact that UNDP takes a new approach to ranking. Countries get the top spot in the New GDI not for the highest value, but for being closest to 1. This matters a bit at the top. In particular, the top spot goes to Slovakia which has a New GDI of exactly 1, while the highest value of the GDI (in Estonia) leads to rank 70. Similarly Russia, the leader in the ratio of the female-male HDI in Table 2 below, is now only on spot 61, due to its large gaps favoring women (or hurting men).

All in all, the GDI is a very welcome addition to the gender measures. It is has a nice direct link to the HDI, is easy to interpret and meaningful, and the new approach to ranking is also a very good idea as it places a premium on gender equality rather than on female relative achievements. Of course, the caveats mentioned above (related to the calculation of female and male earned incomes as the relevant income component) remain and need to be stated clearly. But overall this is very welcome new measure that is surely going to generate great interest in years to come.

7. Conclusions

This paper has reviewed existing measures of gender-related development, including UNDP's Gender Inequality Index (GII). It has shown that existing measures all seem to suffer from a range of conceptual or empirical problems. I have also tried to argue that the best way forward would be to abandon the GII and revert to suitably reformed measures of the GDI, where my proposal is to replace it with the (capped, uncapped or both) GGM, and reforms to the GEM, where my proposal is to revert to GEM3 proposed here. Lastly, I argue that the New GDI, which is related to one of the porposals made here, is a very welcome addition to the suite of Human Development Indicators and addresses some of the short-comings identified here. Of course, none of these measures fully address the many conceptual and empirical difficulties of capturing gender inequalities in its many different dimensions in a cross-country context. But hopefully they contribute to continuing the debate on this important issue.

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Table 2 UNDP's GDI, a Male and Female HDI, and two versions of a Gender Gap Index (2004)

	(1) UNDP's GDI	(2) GDI Rank	(3) Female HDI	(4) Male HDI	(5) Ratio Female-to-Male HDI	(6) Female HDI Rank	(7) Female/Male HDI Rank	(8) GGM	(9) GGM Rank	(10) GGM (Capped)	(11) GGM Rank (Capped)
Norway	0.962	1	0.957	0.968	0.988	1	17	0.963	14	0.958	3
Iceland	0.958	2	0.950	0.967	0.983	3	28	0.959	17	0.950	7
Australia	0.956	3	0.947	0.966	0.980	5	35	0.931	37	0.931	23
Ireland	0.951	4	0.936	0.970	0.965	10	50	0.905	51	0.901	51
Sweden	0.949	5	0.947	0.952	0.995	4	11	0.967	10	0.958	4
Luxembourg	0.949	6	0.953	0.944	1.010	2	8	0.893	56	0.884	58
Canada	0.947	7	0.938	0.958	0.980	8	33	0.951	19	0.945	13
United States	0.946	8	0.939	0.955	0.984	7	27	0.951	18	0.940	18
Netherlands	0.945	9	0.933	0.958	0.975	12	39	0.920	47	0.918	36
Switzerland	0.944	10	0.930	0.960	0.969	14	43	0.930	39	0.927	29
Finland	0.943	11	0.940	0.948	0.992	6	14	0.970	9	0.957	5
Belgium	0.943	12	0.935	0.951	0.983	11	29	0.912	49	0.902	49
Japan	0.942	13	0.926	0.962	0.963	16	53	0.881	61	0.870	67
France	0.940	14	0.937	0.945	0.991	9	15	0.946	24	0.930	25
Denmark	0.940	15	0.932	0.949	0.983	13	30	0.950	23	0.947	10
United Kingdom	0.938	16	0.929	0.948	0.980	15	34	0.936	35	0.929	26
Austria	0.937	17	0.920	0.959	0.959	20	56	0.920	45	0.914	42
Italy	0.934	18	0.921	0.951	0.968	19	46	0.863	68	0.852	76
Spain	0.933	19	0.926	0.944	0.980	17	32	0.891	54	0.872	66
New Zealand	0.932	20	0.924	0.942	0.981	18	31	0.943	31	0.938	19
Germany	0.928	21	0.916	0.943	0.971	21	42	0.923	44	0.918	35
Israel	0.925	22	0.910	0.940	0.968	22	44	0.946	30	0.946	11
Greece	0.917	23	0.905	0.932	0.971	24	41	0.879	63	0.873	64
Slovenia	0.908	24	0.906	0.911	0.994	23	12	0.958	15	0.934	21
Korea, Rep. of	0.905	25	0.885	0.929	0.953	26	61	0.885	60	0.873	65
Macau	0.902	26	0.875	0.934	0.936	28	71	0.900	59	0.900	53
Portugal	0.902	27	0.896	0.909	0.986	25	22	0.947	20	0.930	24
Cyprus	0.900	28	0.883	0.920	0.960	27	55	0.907	52	0.907	46

Czech Republic	0.881	29	0.868	0.897	0.967	32	47	0.927	38	0.918	38
Malta	0.869	30	0.852	0.889	0.958	36	58	0.785	95	0.780	104
Hungary	0.867	31	0.868	0.868	0.999	31	9	0.933	33	0.907	47
Kuwait	0.864	32	0.834	0.889	0.938	40	67	0.792	93	0.789	103
Argentina	0.859	33	0.855	0.866	0.987	35	18	0.915	43	0.890	56
Poland	0.859	34	0.858	0.862	0.996	33	10	0.953	16	0.925	32
Estonia	0.856	35	0.868	0.846	1.027	30	4	0.997	5	0.953	6
Lithuania	0.856	36	0.869	0.845	1.028	29	3	0.998	6	0.988	1
Slovakia	0.853	37	0.849	0.860	0.987	37	19	0.940	27	0.920	34
Chile	0.850	38	0.829	0.878	0.944	41	64	0.807	88	0.802	95
Bahrain	0.849	39	0.808	0.886	0.912	44	79	0.660	122	0.660	137
Uruguay	0.847	40	0.846	0.852	0.994	38	13	0.932	34	0.903	48
Croatia	0.844	41	0.838	0.851	0.985	39	24	0.921	42	0.909	45
Latvia	0.843	42	0.857	0.831	1.031	34	2	0.982	7	0.927	28
Costa Rica	0.831	43	0.812	0.853	0.952	42	62	0.818	86	0.815	86
UAE	0.829	44	0.798	0.852	0.937	48	70	0.711	102	0.683	133
Bulgaria	0.814	45	0.807	0.824	0.979	45	36	0.940	32	0.929	27
Mexico	0.812	46	0.786	0.844	0.931	51	76	0.793	96	0.793	99
Tonga	0.809	47	0.785	0.837	0.938	53	69	0.846	80	0.844	79
Panama	0.806	48	0.794	0.821	0.967	49	48	0.863	69	0.858	73
Trinidad and Tobago	0.805	49	0.788	0.825	0.954	50	59	0.858	72	0.852	75
Romania	0.804	50	0.799	0.811	0.985	47	25	0.947	22	0.932	22
Russian Federation	0.795	51	0.811	0.783	1.036	43	1	1.015	2	0.940	17
Malaysia	0.795	52	0.765	0.831	0.919	62	78	0.819	87	0.819	85
Belarus	0.793	53	0.802	0.786	1.021	46	5	1.002	3	0.948	9
Mauritius	0.792	54	0.765	0.825	0.928	60	77	0.805	92	0.795	98
Macedonia, TFYR	0.791	55	0.769	0.817	0.941	58	65	0.854	78	0.854	74
Brazil	0.789	56	0.786	0.795	0.988	52	16	0.920	40	0.896	54
Colombia	0.787	57	0.778	0.799	0.973	56	40	0.925	41	0.916	40
Oman	0.785	58	0.717	0.854	0.839	72	106	0.589	139	0.589	144
Thailand	0.781	59	0.770	0.795	0.968	57	45	0.943	29	0.927	30
Albania	0.780	60	0.765	0.799	0.958	61	57	0.896	57	0.891	55
Venezuela	0.780	61	0.767	0.797	0.962	59	54	0.888	58	0.880	60

Kazakhstan	0.772	62	0.780	0.767	1.017	54	6	1.023	1	0.965	2
Ukraine	0.771	63	0.778	0.770	1.011	55	7	0.997	4	0.936	20
Samoa (Western)	0.770	64	0.752	0.794	0.947	64	63	0.810	85	0.798	96
China	0.765	65	0.739	0.793	0.932	66	74	0.915	50	0.915	41
Armenia	0.765	66	0.761	0.771	0.987	63	20	0.962	12	0.944	15
Philippines	0.761	67	0.748	0.775	0.965	65	49	0.871	67	0.865	71
Peru	0.759	68	0.726	0.798	0.910	69	81	0.874	70	0.873	61
Sri Lanka	0.749	69	0.725	0.777	0.933	70	73	0.765	101	0.763	106
Jordan	0.747	70	0.701	0.800	0.877	74	91	0.674	123	0.674	134
Dominican Republic	0.745	71	0.734	0.761	0.964	67	52	0.846	71	0.823	83
Turkey	0.745	72	0.696	0.804	0.865	76	97	0.671	129	0.671	135
Saudi Arabia	0.744	73	0.675	0.827	0.816	83	112	0.552	142	0.552	148
Tunisia	0.744	74	0.695	0.806	0.862	77	98	0.685	125	0.685	131
Iran, Islamic Rep. of	0.736	75	0.690	0.788	0.876	78	92	0.753	111	0.753	111
Azerbaijan	0.733	76	0.727	0.742	0.979	68	37	0.962	13	0.944	14
El Salvador	0.725	77	0.702	0.753	0.932	73	75	0.853	77	0.847	78
Jamaica	0.721	78	0.718	0.728	0.986	71	21	0.936	28	0.902	50
Cape Verde	0.714	79	0.678	0.764	0.887	82	88	0.749	108	0.742	116
Algeria	0.713	80	0.660	0.778	0.847	86	102	0.703	126	0.703	124
Viet Nam	0.708	81	0.686	0.732	0.938	80	68	0.949	26	0.949	8
Indonesia	0.704	82	0.673	0.741	0.907	84	83	0.820	91	0.820	84
Syrian Arab Republic	0.702	83	0.657	0.759	0.866	89	96	0.723	118	0.723	120
Kyrgyzstan	0.701	84	0.698	0.708	0.986	75	23	0.943	21	0.916	39
Uzbekistan	0.694	85	0.683	0.708	0.965	81	51	0.933	36	0.922	33
Moldova, Rep. of	0.692	86	0.688	0.698	0.985	79	26	0.963	11	0.943	16
Bolivia	0.687	87	0.655	0.725	0.904	90	85	0.873	73	0.873	63
Mongolia	0.685	88	0.672	0.704	0.954	85	60	0.880	62	0.870	70
Nicaragua	0.684	89	0.658	0.721	0.912	87	80	0.751	104	0.749	112
Honduras	0.676	90	0.658	0.700	0.940	88	66	0.844	79	0.836	80
Guatemala	0.659	91	0.624	0.708	0.882	92	90	0.731	110	0.718	122
Tajikistan	0.648	92	0.629	0.672	0.936	91	72	0.902	55	0.900	52
South Africa	0.646	93	0.617	0.681	0.905	93	84	0.806	97	0.806	93
Equatorial Guinea	0.639	94	0.588	0.700	0.841	95	104	0.727	127	0.727	119

Namibia	0.622	95	0.595	0.654	0.909	94	82	0.852	83	0.852	77
Morocco	0.615	96	0.555	0.702	0.792	96	116	0.612	143	0.612	142
India	0.591	97	0.530	0.671	0.790	98	117	0.659	137	0.659	138
Cambodia	0.578	98	0.553	0.614	0.901	97	86	0.941	25	0.918	37
Botswana	0.555	99	0.524	0.602	0.870	99	93	0.749	113	0.743	115
Comoros	0.550	100	0.513	0.596	0.862	100	99	0.808	100	0.808	92
Lao People's Dem. Rep.	0.545	101	0.501	0.600	0.835	101	107	0.798	105	0.798	97
Ghana	0.528	102	0.489	0.573	0.853	102	101	0.870	75	0.870	68
Bangladesh	0.524	103	0.479	0.579	0.826	106	111	0.760	115	0.760	107
Papua New Guinea	0.521	104	0.485	0.559	0.868	103	94	0.887	66	0.887	57
Congo	0.519	105	0.483	0.565	0.855	105	100	0.814	98	0.814	88
Pakistan	0.513	106	0.443	0.612	0.724	113	131	0.592	147	0.592	143
Nepal	0.513	107	0.457	0.592	0.772	109	121	0.728	128	0.728	118
Madagascar	0.507	108	0.479	0.540	0.887	107	89	0.911	53	0.911	44
Uganda	0.498	109	0.458	0.545	0.839	108	105	0.861	81	0.861	72
Cameroon	0.497	110	0.447	0.561	0.797	112	115	0.753	120	0.753	110
Sudan	0.492	111	0.437	0.574	0.761	116	126	0.620	141	0.620	140
Kenya	0.487	112	0.456	0.526	0.867	110	95	0.806	103	0.806	94
Lesotho	0.486	113	0.485	0.497	0.976	104	38	0.852	74	0.810	91
Zimbabwe	0.483	114	0.448	0.531	0.843	111	103	0.748	119	0.748	113
Swaziland	0.479	115	0.439	0.544	0.806	115	113	0.576	148	0.576	145
Mauritania	0.478	116	0.439	0.527	0.833	114	108	0.789	106	0.789	102
Togo	0.476	117	0.421	0.562	0.749	118	128	0.694	132	0.694	128
Yemen	0.462	118	0.392	0.588	0.666	121	136	0.573	149	0.573	146
Senegal	0.451	119	0.408	0.511	0.798	119	114	0.756	117	0.756	108
Rwanda	0.449	120	0.424	0.477	0.889	117	87	0.926	46	0.926	31
Nigeria	0.443	121	0.393	0.510	0.770	120	123	0.705	131	0.705	123
Guinea	0.434	122	0.387	0.503	0.771	123	122	0.747	116	0.747	114
Angola	0.431	123	0.387	0.493	0.784	124	120	0.790	107	0.790	101
Tanzania, U. Rep. of	0.426	124	0.390	0.469	0.832	122	109	0.870	76	0.870	69
Benin	0.412	125	0.358	0.493	0.727	125	130	0.684	138	0.684	132
Côte d'Ivoire	0.401	126	0.340	0.489	0.695	130	133	0.617	146	0.617	141
Zambia	0.396	127	0.350	0.458	0.764	127	125	0.718	130	0.718	121

Malawi	0.394	128	0.352	0.448	0.787	126	118	0.813	99	0.813	89
Mozambique	0.387	129	0.344	0.454	0.757	129	127	0.812	94	0.791	100
Burundi	0.380	130	0.348	0.421	0.826	128	110	0.883	65	0.873	62
Congo, Dem. Rep. of the	0.378	131	0.329	0.449	0.732	131	129	0.739	124	0.739	117
Chad	0.350	132	0.308	0.432	0.714	132	132	0.669	134	0.669	136
Central African Republic	0.336	133	0.287	0.418	0.687	135	134	0.701	133	0.701	125
Burkina Faso	0.335	134	0.300	0.383	0.785	133	119	0.767	112	0.767	105
Mali	0.329	135	0.293	0.381	0.769	134	124	0.756	114	0.756	109
Sierra Leone	0.317	136	0.268	0.396	0.677	136	135	0.687	136	0.687	129
Niger	0.292	137	0.244	0.373	0.655	137	137	0.633	144	0.633	139
Barbados	N.A	N.A	N.A.	N.A.	N.A.	N.A	N.A	0.968	8	0.945	12
Myanmar	N.A	N.A	N.A.	N.A.	N.A.	N.A	N.A	0.918	48	0.912	43
Yugoslavia	N.A	N.A	N.A.	N.A.	N.A.	N.A	N.A	0.881	64	0.881	59
Cuba	N.A	N.A	N.A.	N.A.	N.A.	N.A	N.A	0.835	82	0.835	81
Maldives	N.A	N.A	N.A.	N.A.	N.A.	N.A	N.A	0.826	90	0.825	82
Brunei Darussalam	N.A	N.A	N.A.	N.A.	N.A.	N.A	N.A	0.814	89	0.814	87
Suriname	N.A	N.A	N.A.	N.A.	N.A.	N.A	N.A	0.820	84	0.810	90
Liberia	N.A	N.A	N.A.	N.A.	N.A.	N.A	N.A	0.698	135	0.698	126
Libyan Arab Jamahiriya	N.A	N.A	N.A.	N.A.	N.A.	N.A	N.A	0.695	121	0.695	127
Qatar	N.A	N.A	N.A.	N.A.	N.A.	N.A	N.A	0.695	109	0.685	130
Iraq	N.A	N.A	N.A.	N.A.	N.A.	N.A	N.A	0.570	145	0.570	147
Occupied Palestinian Territory	N.A	N.A	N.A.	N.A.	N.A.	N.A	N.A	0.522	140	0.522	149
Afghanistan	N.A	N.A	N.A.	N.A.	N.A.	N.A	N.A	0.493	150	0.493	150
Average	0.707		0.683	0.740	0.906			0.831		0.822	

Table 3 Three Versions of the GEM (for the year 2004)

	(1) UNDP's GEM	(2) Rank	(3) GEM2 (Income Shares)	(4) Rank	(5) GEM3 (Ratios)	(6) Rank	(7) Sum Rank GEM GDI	(8) Sum Rank GGM GEM3
Norway	0.932	1	0.781	2	0.682	2	2	5
Sweden	0.883	2	0.805	1	0.784	1	7	5
Iceland	0.866	3	0.761	7	0.666	4	5	11
Denmark	0.861	4	0.764	6	0.664	5	19	15
Belgium	0.855	5	0.769	5	0.605	9	17	58
Finland	0.853	6	0.773	3	0.672	3	17	8
Netherlands	0.844	7	0.751	11	0.588	12	16	48
Australia	0.833	8	0.750	12	0.620	7	11	30
Germany	0.816	9	0.753	9	0.562	15	30	50
Austria	0.815	10	0.729	15	0.492	25	27	67
Canada	0.810	11	0.721	16	0.565	14	18	27
United States	0.808	12	0.653	33	0.463	31	20	49
New Zealand	0.797	13	0.770	4	0.635	6	33	25
Switzerland	0.797	14	0.696	19	0.475	28	24	57
Spain	0.776	15	0.740	14	0.519	21	34	87
United Kingdom	0.755	16	0.670	26	0.449	33	32	59
Ireland	0.753	17	0.613	44	0.391	45	21	96
Singapore	0.707	18	0.647	37	0.413	38	No GDI	No GGM
Argentina	0.697	19	0.749	13	0.599	10	52	66
Portugal	0.681	20	0.686	24	0.474	29	47	53
Costa Rica	0.675	21	0.751	10	0.541	20	64	106
Trinidad & Tobago	0.660	22	0.718	18	0.510	23	71	98
Israel	0.656	23	0.622	42	0.431	36	45	47
Italy	0.653	24	0.596	49	0.351	55	42	131
Lithuania	0.635	25	0.693	20	0.598	11	61	12
Namibia	0.623	26	0.721	17	0.555	17	121	94
Latvia	0.621	27	0.691	22	0.544	19	69	47
Czech Republic	0.615	28	0.622	43	0.396	42	57	80
Greece	0.614	29	0.598	46	0.372	49	52	113
Poland	0.610	30	0.666	28	0.507	24	64	56
Estonia	0.608	31	0.655	31	0.513	22	66	28
Slovenia	0.603	32	0.597	47	0.397	41	56	62
Croatia	0.602	33	0.666	29	0.479	27	74	72
Slovakia	0.599	34	0.643	38	0.471	30	71	64
Mexico	0.597	35	0.668	27	0.398	40	81	139
Tanzania	0.597	36	0.755	8	0.606	8	160	77
Bulgaria	0.595	37	0.692	21	0.549	18	82	45
Cyprus	0.584	38	0.564	58	0.352	54	66	100
Peru	0.580	39	0.679	25	0.443	34	107	95
Panama	0.568	40	0.666	30	0.462	32	88	105
Hungary	0.560	41	0.587	50	0.401	39	72	86
Japan	0.557	42	0.493	67	0.286	65	55	132
Macedonia, TFYR	0.554	43	0.653	34	0.441	35	98	109
Moldova, Rep. of	0.544	44	0.690	23	0.574	13	130	29
Philippines	0.533	45	0.654	32	0.555	16	112	87
Venezuela	0.532	46	0.637	39	0.482	26	107	86
Honduras	0.530	47	0.652	35	0.391	44	137	124
El Salvador	0.529	48	0.636	40	0.376	48	125	126
Ecuador	0.524	49	0.647	36	0.424	37	No GDI	No GGM

Uruguay	0.513	50	0.596	48	0.368	50	90	98
Colombia	0.506	51	0.607	45	0.377	47	108	87
Chile	0.506	52	0.569	55	0.336	58	90	153
Korea, Rep. Of	0.502	53	0.499	66	0.292	64	78	129
Botswana	0.501	54	0.568	56	0.319	60	153	175
Malaysia	0.500	55	0.563	59	0.303	62	107	147
Bolivia	0.499	56	0.633	41	0.389	46	143	109
Belize	0.495	57	0.585	52	0.348	56	No GDI	No GGM
Malta	0.493	58	0.502	65	0.267	67	88	171
Romania	0.492	59	0.585	51	0.395	43	109	65
Thailand	0.486	60	0.581	53	0.367	51	119	81
Brazil	0.486	61	0.579	54	0.353	53	117	107
Russian Federation	0.482	62	0.565	57	0.364	52	113	69
Ukraine	0.455	63	0.562	60	0.319	59	126	79
Georgia	0.407	64	0.524	61	0.314	61	No GDI	No GGM
Mongolia	0.388	65	0.522	62	0.347	57	153	127
Pakistan	0.377	66	0.479	69	0.248	68	172	211
Bangladesh	0.374	67	0.504	64	0.267	66	170	173
Cambodia	0.373	68	0.517	63	0.300	63	166	100
Sri Lanka	0.372	69	0.479	68	0.235	69	138	175
UAE	0.353	70	0.308	73	0.000	74	114	207
Iran, Islamic Rep. of	0.326	71	0.409	70	0.177	70	146	181
Turkey	0.289	72	0.368	71	0.163	71	144	206
Egypt	0.262	73	0.344	72	0.135	72	No GDI	No GGM
Saudi Arabia	0.242	74	0.262	74	0.000	75	147	223
Yemen	0.128	75	0.241	75	0.064	73	193	219

Table 4: Levels and Rank of GII and GGM (2010)

Country	GII	GII Rank	GGM	GGM Rank	Ratio LE	Ratio Ed	Ratio LF	Capped GGM	Rank
Russian Federation	0.326	41	1.046	1	1.236	1.028	0.900	0.966	8
Lithuania	0.188	26	1.044	2	1.190	1.045	0.915	0.971	6
Kazakhstan	0.331	42	1.041	3	1.207	1.018	0.919	0.972	5
Latvia	0.204	30	1.028	4	1.146	1.057	0.896	0.964	9
Ukraine	0.333	44	1.019	5	1.213	1.016	0.858	0.950	18
Barbados	0.372	52	1.017	6	1.035	1.129	0.901	0.966	7
Moldova (Republic of)	0.287	38	1.015	7	1.076	1.011	0.960	0.987	1
Mongolia	0.409	59	1.009	8	1.092	1.069	0.881	0.958	13
Finland	0.075	6	1.008	9	1.034	1.041	0.951	0.983	2
Sweden	0.047	2	0.995	10	0.980	1.065	0.943	0.974	4
Slovenia	0.160	21	0.989	11	1.044	1.035	0.895	0.964	10
Norway	0.073	5	0.989	12	0.989	1.045	0.936	0.974	3
Iceland	0.103	9	0.988	13	0.969	1.096	0.909	0.959	12
Bulgaria	0.241	34	0.973	14	1.053	1.018	0.859	0.951	17
Poland	0.191	28	0.973	15	1.091	1.053	0.801	0.929	32
Armenia	0.343	46	0.970	16	1.038	1.049	0.839	0.943	21
France	0.094	8	0.969	17	1.036	0.999	0.879	0.957	14
United States	0.297	39	0.966	18	1.003	1.053	0.852	0.948	19
Slovakia	0.194	29	0.964	19	1.072	1.044	0.801	0.929	33
Israel	0.145	19	0.963	20	0.990	1.036	0.872	0.952	15
Denmark	0.052	4	0.962	21	0.990	0.980	0.916	0.962	11
Uruguay	0.364	50	0.960	22	1.050	1.107	0.761	0.913	41
Australia	0.137	16	0.957	23	0.990	1.051	0.842	0.941	24
Portugal	0.137	18	0.956	24	1.028	0.982	0.867	0.948	20
Hungary	0.218	32	0.956	25	1.076	1.008	0.806	0.931	30
United Kingdom	0.215	31	0.955	26	0.983	1.053	0.842	0.939	26
Viet Nam	0.297	40	0.952	27	0.974	0.962	0.921	0.952	16
Croatia	0.170	23	0.951	28	1.051	0.996	0.821	0.935	28
New Zealand	0.190	27	0.949	29	0.979	1.023	0.853	0.942	23
Jamaica	0.452	70	0.948	30	1.006	1.068	0.793	0.926	34
Thailand	0.357	48	0.947	31	1.047	0.977	0.832	0.933	29
Belgium	0.107	12	0.946	32	1.013	1.009	0.829	0.939	25
Rwanda	0.446	66	0.942	33	0.884	0.925	1.023	0.942	22
Romania	0.339	45	0.941	34	1.061	1.005	0.782	0.921	37
Netherlands	0.046	1	0.938	35	0.979	0.981	0.859	0.938	27
Brazil	0.455	71	0.936	36	1.054	1.037	0.751	0.909	43
Czech Republic	0.137	17	0.936	37	1.031	1.017	0.782	0.921	36
Kyrgyzstan	0.374	53	0.936	38	1.104	1.023	0.727	0.899	51
Switzerland	0.050	3	0.930	39	0.993	0.929	0.872	0.930	31
Spain	0.110	14	0.930	40	1.027	1.012	0.774	0.918	39
Argentina	0.375	54	0.930	41	1.064	1.080	0.699	0.887	53
China	0.183	25	0.924	42	0.960	0.934	0.879	0.924	35

Ireland	0.175	24	0.924	43	0.994	1.019	0.778	0.918	40
Austria	0.103	10	0.923	44	1.007	0.926	0.843	0.921	38
Luxembourg	0.168	22	0.910	45	1.004	0.956	0.786	0.909	42
Namibia	0.468	74	0.910	46	0.865	1.036	0.841	0.899	50
Cyprus	0.118	15	0.905	47	0.985	0.915	0.822	0.905	44
Peru	0.394	57	0.905	48	1.006	0.932	0.790	0.903	46
Ghana	0.523	86	0.904	49	0.899	0.827	0.995	0.904	45
Venezuela (Bol. Rep.)	0.452	69	0.904	50	1.024	1.104	0.653	0.868	60
Lao PDR	0.478	77	0.903	51	0.933	0.781	1.010	0.903	47
Japan	0.107	13	0.901	52	1.041	0.965	0.729	0.889	52
Tanzania	0.603	98	0.900	53	0.867	0.863	0.975	0.900	48
Tajikistan	0.355	47	0.899	54	1.049	0.936	0.741	0.885	55
Cambodia	0.448	68	0.899	55	0.919	0.896	0.884	0.899	49
Burundi	0.439	65	0.887	56	0.862	0.781	1.036	0.887	54
Greece	0.148	20	0.883	57	0.999	0.984	0.701	0.883	56
Italy	0.104	11	0.882	58	1.008	0.982	0.693	0.879	58
Bolivia	0.460	72	0.881	59	0.982	0.900	0.773	0.881	57
Philippines	0.431	61	0.878	60	1.051	1.035	0.623	0.854	63
Korea, Rep.	0.089	7	0.875	61	1.039	0.894	0.721	0.864	61
Kenya	0.566	95	0.875	62	0.878	0.873	0.873	0.875	59
Guyana	0.506	83	0.874	63	1.039	1.117	0.576	0.832	71
Lesotho	0.545	92	0.874	64	0.587	1.245	0.914	0.813	75
El Salvador	0.472	76	0.869	65	1.129	0.934	0.622	0.834	69
Cuba	0.332	43	0.864	66	0.977	1.048	0.631	0.851	64
Panama	0.498	81	0.863	67	1.005	1.057	0.605	0.846	66
Paraguay	0.468	75	0.863	68	0.978	1.000	0.657	0.863	62
Chile	0.364	51	0.853	69	1.026	0.990	0.610	0.845	67
Botswana	0.493	79	0.849	70	0.680	0.980	0.918	0.849	65
Malawi	0.542	90	0.839	71	0.765	0.804	0.960	0.839	68
Costa Rica	0.362	49	0.839	72	0.997	1.022	0.580	0.833	70
Colombia	0.479	78	0.837	73	1.063	1.015	0.543	0.816	74
Malaysia	0.275	36	0.822	74	0.985	0.991	0.569	0.822	72
Belize	0.497	80	0.817	75	0.950	0.980	0.585	0.817	73
Qatar	0.543	91	0.814	76	0.878	1.159	0.530	0.775	85
Mexico	0.438	63	0.808	77	0.997	0.968	0.547	0.808	76
Indonesia	0.448	67	0.802	78	0.952	0.878	0.618	0.802	77
Honduras	0.502	82	0.799	79	0.992	1.001	0.513	0.798	78
Sri Lanka	0.408	58	0.796	80	1.032	1.019	0.479	0.783	83
Guatemala	0.517	84	0.795	81	1.060	0.853	0.556	0.780	84
Malta	0.222	33	0.792	82	0.995	0.939	0.532	0.792	79
Mauritania	0.530	89	0.792	83	0.935	0.723	0.735	0.792	80
Mozambique	0.528	88	0.791	84	0.820	0.610	0.990	0.791	81
Senegal	0.525	87	0.787	85	0.886	0.757	0.726	0.787	82
Swaziland	0.559	94	0.780	86	0.638	1.023	0.728	0.775	86
Benin	0.546	93	0.765	87	0.944	0.551	0.862	0.765	87
Cameroon	0.601	97	0.759	88	0.832	0.801	0.657	0.759	88
Togo	0.466	73	0.728	89	0.913	0.564	0.748	0.728	89
Algeria	0.377	55	0.721	90	0.948	0.859	0.460	0.721	90
Bahrain	0.283	37	0.711	91	0.913	1.016	0.387	0.707	92

Iran (Is. Rep.)	0.433	62	0.709	92	0.966	0.830	0.445	0.709	91
Congo (DR)	0.631	100	0.698	93	0.868	0.592	0.661	0.698	93
Tunisia	0.259	35	0.685	94	0.982	0.876	0.373	0.685	94
Mali	0.646	102	0.673	95	0.837	0.660	0.553	0.673	95
Turkey	0.379	56	0.663	96	0.989	0.819	0.361	0.663	96
India	0.567	96	0.659	97	0.938	0.723	0.422	0.659	97
Jordan	0.431	60	0.650	98	0.944	0.924	0.315	0.650	98
Morocco	0.439	64	0.622	99	0.987	0.711	0.343	0.622	99
Saudi Arabia	0.644	101	0.610	100	0.932	0.915	0.267	0.610	100
Niger	0.666	103	0.578	101	0.808	0.556	0.430	0.578	101
Pakistan	0.523	85	0.529	102	0.901	0.655	0.251	0.529	102
Yemen	0.687	104	0.485	103	0.936	0.450	0.271	0.485	103
Afghanistan	0.609	99	0.467	104	0.700	0.374	0.389	0.467	104

Source: Own elaboration based on HDRO database.