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UNDP's Gender-related Measures: Some Conceptual Problems and Possible Solutions

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Abstract This paper critically reviews conceptual and empirical problems issues with the United Nations Development Programme's two gender-related indicators: the Gender-related Development Index and the Gender Empowerment Measure. While supporting the need for gender-related development measures, the paper argues that there are serious conceptual and empirical problems with both measures that limit the usefulness of these composite indicators. Where appropriate and feasible, the paper suggests modifications to the measures that address some of the identified problems.

Key words: Gender, Well-being, Empowerment, Gender-related Development Index, Gender Empowerment Measure

Introduction

Based on background papers by Anand and Sen (1995), the United Nations Development Programme (UNDP) introduced in 1995 two gender-related indicators in the *Human Development Report* (UNDP, 1995). These indicators, the Gender-Related Development Index (GDI) and the Gender Empowerment Measure (GEM), were introduced to address two issues at once. First, the aim was to add to the more well-known and already established Human Development Index (HDI) a distribution-sensitive measure.[1] At the same time, the gender dimension of human development was to receive recognition in the measurement of human development. The combination of the two concerns generated the GDI, which is a distribution-sensitive measure that accounts for the human development impact of existing gender gaps in the three components of the HDI. The GEM was a more specialized measure focusing on the relative empowerment of women. The consideration of gender gaps in the assessment of human development was timely, coinciding with the Beijing Conference, and is clearly valuable given the large gender gaps that exist in many

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dimensions of human development in many countries (see UNDP, 1995; World Bank, 2001; Klasen and Wink, 2003; Klasen, 2006).

More than 10 years after their introduction, it is fair to say, however, that the two measures have not had the anticipated impact in playing a central role in measuring and promoting gender-sensitive development. While the HDI has established itself as the highly visible flagship indicator of human development, the GDI and GEM are seen as quite specialized and not easily interpretable measures. The weaknesses in the impact of the two measures surely relate partly to the data gaps and the associated problem to achieve comprehensive coverage. More importantly, the indicators are not easily interpreted and, in fact, are often misinterpreted, which undermined their usefulness (see Schüler's contribution in this *Journal of Human Development* (*JHD*) special issue). Third, these measures of gender-related development do not meet a demand from the policy and advocacy community to have easily understandable and internationally comparable composite measures of gender *gaps*. As a result, many other composite measures of gender inequality have been proposed by various policy and advocacy organizations to meet this demand that was not met by the GDI or GEM.[2] Finally, there were immediately some serious criticisms of the conceptual underpinnings of the measures, and many alternative measures have been proposed since their introduction.[3]

In this paper, I will review the conceptual underpinnings of the two measures, discuss empirical issues regarding their application, provide a careful review of the merits and problems of the measures, and then propose a range of possible solutions to the identified problems.

Before beginning with a review of the measures, I first want to address some fundamental criticism against the very idea of creating such composite measures of human development. While there is near unanimous agreement that the presentation of country performance in terms of several dimensions of human development (as done in the tables at the back of the *Human Development Reports*) is useful, it is quite easy to criticize the idea of then trying to combine these different dimensions of human development in one single index. There are questions of the choice and weight of dimensions, how one should deal with the distribution of achievements within each dimension, whether the implicit trade-offs are acceptable or not, and whether such a composite measure hides more than it reveals. These criticisms can and have been levelled against the HDI, as well as the other composite indices that have followed (for example, Ravallion, 1997). Regarding the GDI and GEM, it is particularly easy to criticize the rather narrow range of issues that receive attention (and the many gender issues that are not reflected in the measure), and the implicit trade-offs and weights that are implied by the aggregation procedure. Such types of critiques, while valid and useful at some level, do not constructively advance the debate about how best to generate summary measures of development for which there clearly is a great demand.

Also, they misunderstand the very nature of the project UNDP pursued when introducing the HDI and the related measures. As has been recounted many times, the first director of the Human Development Report Office (HDRO), Mabub ul Haq, intended the HDI not to be the definitive measure of human development, but to create a plausible and superior rival to the even cruder measure of development, which is Gross Domestic Product (GDP) per capita (Haq, 1995). In order to create such an alternative, Haq established several principles: it had to remain simple (in fact, he insisted that it must be one number to rival the one other number [i.e. GDP per capita]); it had to be easily calculated with roughly internationally comparable data that must be available on an annual basis; and it had to be easily interpretable. If one accepts the premise of this project, one can then accept that, despite the fundamental problems of such composite measures of development, they serve a useful purpose. Therefore efforts to improve these measures should be based on the same principles. I will therefore proceed accepting that it is in principle useful to create composite measures of human development.[4] The critical challenge therefore is how best to address gender issues within this framework of composite development measures.

The Gender-related Development Index

In principle, the GDI is a gender-sensitive extension of the HDI. It extends the HDI by accounting for the human development impact of existing gender gaps in the three dimensions of the HDI (i.e. life expectancy, education, and incomes). The way it assesses the human development impact of gender gaps in these dimensions is to use the concept of ''inequality aversion'' proposed by Atkinson (1970) and thus uses an inequality aversion parameter to create a well-being ''penalty'' for gender gaps. The concept of ''inequality aversion'' is well established in the inequality literature. Alternatively, one can interpret the ''penalty'' for gender inequality as coming from a declining marginal valuation of human development achievements. For example, if a county had an average adult literacy rate of 50%, but only 30% for females and 70% for males, the 20% higher literacy for males generates lower additional human development than the human development loss caused by the 20% lower literacy rates for females. Both interpretations lead to a concave social welfare function, and the inequality aversion parameter ε determines the concavity of that function or the strength of inequality aversion. The choice of two for the inequality aversion parameter used for the GDI is within the range discussed in the inequality literature.[5] Thus the average human development achievement in each dimension is ''penalized'' by the existing gender inequality in that dimension.

When considering the three dimensions, a few further complications arise. While for the education measures the calculation of the average achievement and the gender gaps is straightforward, for the life expectancy

component the UNDP made the assumption that, in the absence of any gender bias in the treatment of males and females, females would outlive males by five years. Although the size of that biological advantage of females is controversial (see Waldron, 1983), it is not contested that such an advantage exists. Thus a gender gap in longevity is only assumed to exist in the calculation of the GDI if the gender gap in life expectancy differs from a five-year advantage for females (see below).

A second complication arises with the income component. The income component of the HDI is meant to capture all the aspects of human development that are correlated with income, such as nutrition, housing, clothing, and other goods that are valuable for human development and typically available in markets, and thus can be procured with adequate incomes (see Anand and Sen, 2000). In order to calculate gender gaps in incomes, the UNDP chose to use (the log of) earned incomes for males and females as the measure of gender gaps in incomes. As shown in the annex to the guest editor's introduction in this special issue, they calculate earned incomes by multiplying wages in the non-agricultural sector with labour force participation rates to calculate how much of the GDP is earned by males and females. They then used the gap in the log of these earned incomes as the proxy for the gaps in this dimension of human development and apply the ''penalty'' for gender inequality to these gaps.[6] This procedure will be critically evaluated later.

Before proceeding, it is critical to note two things. First, the GDI is one example of a distribution-sensitive version of the HDI and has chosen to focus on the gender gaps as the relevant inequality. One could also consider other dimensions of inequality to adjust the HDI. For example, one could have used the gaps between groups defined by quintiles of the income distribution, different ethnic groups, or in different regions of the country. Thus one should see the GDI in the much broader context of possible distribution-sensitive versions of the HDI that each applies a penalty for inequality in a particular dimension (e.g. region, race, ethnicity, or gender).

The second point of note is that the GDI is not a measure of gender inequality *per se*.[7] From a certain index value of the GDI we cannot infer at all whether gender gaps in a particular country are large or small, or have large or trivial consequences. The one thing we can do is to compare the GDI of a country with its HDI, and the comparison (either the difference or the ratio) will tell us by how much gender inequality in the three dimensions of the HDI lowers overall human development, given the assumption about inequality aversion. Thus we can learn about the *human development penalty* of the gender inequality, but even such a comparison will tell us little about the precise magnitude of the gender gaps that attracted this penalty without reference to the rather complex formula that calculated this penalty.[8] As shown by Schüler in her contribution to this *JHD* special issue, this is the most misunderstood point about the GDI, which in practical applications is often seen as a

measure of gender gaps which it is not. The frequent misinterpretation of the GDI as a measure of gender gaps and the recent proliferation of alternative gender gap measures suggests that there is a high demand for an index of gender inequality and the UNDP might want to consider generating such a measure (see later; Klasen, 2006).

Conceptual problems of the GDI

The procedure of adjusting average achievement downwards by the gender gaps in these achievements is relatively unproblematic in the education component, and I will therefore say nothing more about that component. It is more problematic in the life expectancy and the earned income components. Let me first turn to the life expectancy component.

Two particular problems appear in the life expectancy component. First, while it is (roughly) true that females, if treated equally as males, will outlive them by some three to seven years, it is not necessarily obvious that one should assume such a biological disadvantage for males should simply be ignored in a human development measure.[9] Whether one should treat this biological advantage of females as ''normal'' largely depends on how one defines inequality. If one defines gender equality to mean that no one should receive a longevity disadvantage on the basis of one's sex, then one might well make the case that the biological life expectancy disadvantage for males should be considered as a form of gender inequality and thus attract an inequality aversion penalty. For the purposes of measuring human development such a view is possibly plausible, as a shorter life span for males clearly reduces a particularly important aspect of one's life; namely, the length of that life.[10] If, however, one takes the perspective that gender inequality in longevity only exists if the gender gaps are the result of discriminatory treatment of males or females or differences in behaviour, then one could define the five-year advantage for females as normal. This is, for example, the procedure implicitly used to calculate the number of ''missing females'' in the world, which precisely wants to assess the magnitude of the survival disadvantage for females in various regions of the world that was caused by discriminatory treatment of females (for example, Klasen and Wink, 2003). Since the GDI does not want to assess the impact of discrimination but the impact of gender gaps in well-being on overall human development, it is not clear that the current assumption of a five-year advantage can be easily justified.

On the other hand, assuming that only equality of life expectancy signifies absence of inequality would lead to paradoxical policy implications, as equality in life expectancy can be achieved only by preferential treatment of males or, conversely, discrimination against females.[11] To the extent that the UNDP has always seen the *Human Development Reports* and its composite measures as *advocacy* tools for policies promoting human development rather than as pure well-being measurement tools, avoidance of these paradoxical policy conclusions might well justify the

current practise or assuming a ''normal'' survival advantage for females despite their theoretical limitations.

The second conceptual problem associated with the life expectancy component is that it ignores a particular problem that has arisen recently in some parts of Asia; namely, the issue of sex-selective abortions. In a number of countries, including China, India, and South Korea, the sex ratios at birth (defined as the ratio of males to females born) have recently risen considerably as a result of a dramatically increased incidence of sex-selective abortions of female foetuses (Klasen and Wink, 2003). At the same time the treatment of living female children has improved, and thus female life expectancy of those who are allowed to be born has risen. In the logic of the GDI, the gender gap in life expectancy has been reduced as the girls that were never born are not considered (see Klasen, 2006). To be sure, this is a rather general problem with many indicators of development including GDP per capita and the HDI that always only consider the achievements of the living and ignore the dead or those that could potentially be alive (see Kanbur and Mukherjee, 2003).[12] There are no easy solutions to this problem. One could consider the ''potentially alive'' as the relevant population in an assessment of human development and would therefore include both the victims of sex-selective abortions as well as those of post-birth neglect in a human development assessment. The practical implementation of such an approach is not easy as it is unclear what levels of human development one would impute to those that are ''potentially'', but not actually, alive (see Bardhan and Klasen, 1999; Kanbur and Mukherjee, 2003; Klasen, 2006).

This problem not only affects the life expectancy component, but, through the impact it has on the male and female population shares, also the other components of the index. When the aversion to inequality measure is calculated, the female and male population shares are also used in order to generate a mean achievement that reflects the population shares and adjusts for the inequality between males and females. (see annex to guest editor's introduction in this special issue) If, as a result of sex-selective abortions or sex-selective neglect, the female population share is much lower than the male population shares (as it is in a number of South Asian countries as well as in China; see Klasen and Wink, 2003), the same female–male gaps in life expectancy, education, or earned income now attract a lower overall penalty for gender inequality because fewer females (as a share of the population) are affected by it! This seems highly problematic and counter-intuitive, but there is no easy way out as the population shares are necessary to ensure that the GDI remains consistent and comparable with the HDI. But clearly this is a problem that should be recognized and possibly changed (see later).

The most serious conceptual problems arise with the earned income component. As discussed in detail in Bardhan and Klasen (1999), it is doubtful that the earned income component is actually measuring what it is intended to measure, which is to measure gender gaps in human

development achievements that are correlated with incomes such as nutrition, clothing, shelter, and the like. The reason why this is the case is that incomes of males and females are typically shared at the household level so that the contributor of earnings and the beneficiary of consumption need not (and often are not) the same. To be sure, the terms of this sharing are often quite unequal along gender lines and gender differences in earned incomes affect this inequality (see Thomas, 1997; Klasen, 1998; World Bank, 2001). It is quite unlikely, however, that the gender gap in (the log of) earned incomes is a reflection of gender gaps in nutrition, shelter, clothing, and other human development-related consumption items. An example might be useful here. As shown in the *Human Development Reports*, the gender gaps in earned incomes are huge in some parts of the world. For example, in Saudi Arabia women earned only about $4000 in 2003, compared with over $20,000 for men (UNDP, 2005). This is virtually exclusively driven by huge gender gaps in labour force participation (and slightly magnified by gender gaps in earnings). It is not plausible that the gender gap in consumption is as high as suggested by these earnings differentials.[13]

This problem is aggravated by the fact that some human-development related expenditure, particularly housing, is a public good at the household level. Even if the male paid for it entirely in some country (because, for example, women are not allowed to work and earn incomes to pay for it themselves), the entire family benefits from this public good. Thus it is simply conceptually flawed to assume that gender gaps in earned incomes are a reflection of gender gaps in human development-related consumption.[14]

A further problem of the earned income component is that it is assumed that only earned incomes generate human development, and that the large amount of unpaid work, including care activities undertaken by women everywhere, does not contribute to human development at all (see Bardhan and Klasen, 1999; see contribution by Folbre in this special issue).

To be sure, this problem with the earned income component is specific to focusing on gender in a distribution-sensitive measure. If one calculated an HDI adjusted by regional or ethnic inequality, the differences in incomes by ethnic group or by region would well reflect the differences in consumption of human development-related goods, as the groups considered here do not share incomes at the household level, but reside predominantly in different households. There are no obvious solutions to this rather deep problem with the earned income component when applied to gender inequality in the GDI. Below I will, however, suggest some ways in which one could mitigate this problem.

Apart from the conceptual problems with the individual components, further problems arise when the three components are put together. First, there is the usual issue of implicit weights and trade-offs that are inherent in such an aggregation. As shown in Bardhan and Klasen

(1999) and Dijkstra (2002), the impact of gender gaps in the three components depends on the differences in the indices of male and female achievements, which in turn hinges on the actual gaps in achievements as well as the range of achievements that are being considered when the achievement index is calculated.[15] The decisions about weights and aggregation rules are essentially arbitrary. Whether this generates problems of interpretation or leads to unintended consequences is largely an empirical issue taken up later.

A second issue arises with the symmetric treatment of gender gaps hurting females or males. The same penalty for inequality is meted out regardless of whether the gap is hurting females or males. Thus it is perfectly possible (and indeed empirically relevant; see later) that the aggregate penalty for gender inequality (i.e. the difference between the HDI and GDI) is made up of penalties for gender inequality favouring males in one dimension (e.g. earned incomes) and penalties for gender inequality favouring females in another dimension (e.g. life expectancy or education). In fact, this is a common constellation in transition countries. The gender gaps in opposite directions are therefore cumulated in the GDI. Clearly this poses a problem for interpreting the results of the GDI, which can only sensibly be done if the underlying gender gaps in each component are also examined to understand whether the gaps all favour one sex or go in different directions. Moreover, one may wonder whether cumulating gender gaps going in opposite directions is an empirically sensible way to proceed. The obvious alternative would be to allow for gender gaps to ''compensate'' or cancel each other (rather than accumulate). Allowing for such compensation would, in a sense, be more in the spirit of the implicit trade-offs in the HDI, where one can trade off higher life expectancy against higher incomes to achieve the same HDI and one might similarly want to allow trading off gender gaps in one dimension favouring males against gaps favouring females in another dimension. Some of the following proposed measures allow for such trade-offs.[16]

Apart from these conceptual problems, other problems arise when one examines empirical results for the HDI and GDI. This is taken up presently.

Empirical issues and problems of the GDI

Before discussing the current GDI figures, two points are worth noting. First, the methodology for calculating the GDI changed significantly in 1999 when an unintended inconsistency in the formula for the earned income component between the HDI and the GDI was corrected (for details see Bardhan and Klasen, 1999, 2000), which led to a major change in the values and rankings of the GDI.[17] Thus the GDI is not comparable before and after 1999, and in fact the published results for 1995–1998 should not be used. This is point worth noting in the *Human Development Reports*. The change was briefly mentioned in the 2000

report (UNDP, 2000) but it might be important to state it more prominently. Secondly, in contrast to the HDI, the HDRO does not recalculate historical GDIs when new data become available. Thus changes in the GDI over time might only be due to better data sources rather than real changes in the underlying data. This is a point worth noting as well, and the HDRO should seriously consider updating the historical series of the GDI (and GEM) and its components regularly, and making these data available.[18]

Table 1 presents the GDI, the HDI,[19] the difference between the two that represents the implied penalty due to gender inequality, and the amount and share of the penalty due to gender gaps in longevity, education, or earned incomes—all based on the year 2003, which was included in the 2005 report. A number of features are noteworthy.

First, the average penalty due to gender inequality, which can be seen at the bottom of the table where the average difference between the HDI and the GDI is reported, is quite small. The GDI is, on average, about 0.004 points or about 0.6% lower than the HDI. That is very small indeed and gives the impression that the impact of gender gaps on human development is miniscule. In high human development countries, the difference between GDI and HDI is even lower, only 0.0014 points, or only 0.15% lower than the HDI. This gives the somewhat misleading impression that gender gaps are largely irrelevant for human development in rich countries.[20] The reason for this small difference is that the gender gaps in the three dimensions captured are indeed not very large. Moreover, using the aversion to inequality formula further dampens the effect where small gaps attract an even smaller penalty. Given the prevalence of gender inequality in dimensions not captured by the GDI (e.g. in pay and promotions, time availability and use, in types of education, etc.), this impression generated is a bit unfortunate.

Second, the existing gender gaps in life expectancy attract very little penalty. On average, the penalty is only 0.0004 points, and nowhere does it exceed 0.004. Interestingly, the countries attracting the largest (of these overall tiny) penalties are the transition countries where the gender gap is disfavouring males, and the AIDS-affected countries of Africa where the gender gap is disfavouring females. But this interesting observation is mitigated by the tiny penalty for these gaps. Given the critical important of life expectancy for human development, one might well want to consider using a larger aversion to inequality factor here to make the impact of these gaps more visible (see Sen, 1998).

Conversely, it remains the case that about 66% of the overall penalty for gender inequality is meted out for gender gaps in earned incomes as the gender differences in the earned income index are much larger than in the other two components. Given the serious conceptual drawbacks discussed earlier, this is really quite a problem. The largest share of the rather small implied human development penalty for gender gaps is based on the highly problematic assumption that gender gaps in earned incomes

Table 1. The GDI, the GEM, and the implied penalties of gender inequality for 2003

	GDI	HDI	HDI – GDI	Life expectancy penalty	Education penalty	Earned income penalty	Share life expectancy penalty (%)	Share education penalty (%)	Share earned income penalty (%)
Norway	0.9603	0.9605	0.0002	*0.000000*	*0.00001*	0.00020	*0.0*	*5.4*	94.6
Australia	0.9536	0.9539	0.0003	*0.000000*	0.00000	0.00026	*0.2*	0.0	99.8
Iceland	0.9531	0.9536	0.0005	0.000035	0.00008	0.00034	7.6	18.4	74.0
Sweden	0.9471	0.9474	0.0004	0.000006	0.00000	0.00035	1.8	0.0	98.2
Canada	0.9465	0.9470	0.0005	*0.000000*	0.00001	0.00050	*0.0*	2.5	97.5
Switzerland	0.9463	0.9463	0.0000	*0.000008*	0.00001	0.00003	*17.8*	25.9	56.3
Luxembourg	0.9440	0.9441	0.0001	*0.000044*	*0.00000*	0.00004	*48.6*	*3.4*	47.9
United States	0.9422	0.9427	0.0006	*0.000004*	*0.00006*	0.00052	*0.7*	*9.9*	89.4
Belgium	0.9409	0.9419	0.0010	*0.000040*	0.00000	0.00095	*4.0*	0.0	96.0
Ireland	0.9394	0.9413	0.0019	*0.000001*	*0.00007*	0.00186	*0.0*	*3.6*	96.3
Netherlands	0.9393	0.9402	0.0010	*0.000004*	0.00000	0.00097	*0.4*	0.0	99.6
Finland	0.9395	0.9399	0.0003	*0.000073*	0.00000	0.00027	*21.5*	0.0	78.5
Japan	0.9373	0.9389	0.0016	*0.000099*	0.00000	0.00150	*6.2*	0.2	93.6
Denmark	0.9383	0.9385	0.0003	0.000004	0.00001	0.00024	1.6	2.6	95.8
United Kingdom	0.9367	0.9373	0.0006	0.000003	0.00000	0.00058	0.5	0.0	99.5
France	0.9351	0.9359	0.0008	*0.000117*	*0.00002*	0.00070	*14.0*	*2.1*	83.9
Italy	0.9281	0.9297	0.0016	*0.000033*	*0.00002*	0.00154	*2.0*	*1.3*	96.7
New Zealand	0.9285	0.9289	0.0004	0.000005	0.00003	0.00038	1.3	7.2	91.4
Austria	0.9261	0.9288	0.0027	*0.000017*	*0.00000*	0.00271	*0.6*	*0.2*	99.2
Germany	0.9259	0.9269	0.0010	*0.000018*	0.00000	0.00095	*1.8*	0.1	98.1
Spain	0.9219	0.9238	0.0019	*0.000134*	*0.00003*	0.00173	*7.1*	*1.6*	91.4
Hong Kong	0.9116	0.9127	0.0011	*0.000022*	0.00027	0.00084	*1.9*	23.8	74.2
Israel	0.9114	0.9124	0.0010	0.000020	0.00000	0.00097	2.0	0.2	97.8
Greece	0.9067	0.9084	0.0017	*0.000002*	*0.00001*	0.00166	*0.1*	*0.4*	99.5
Slovenia	0.9014	0.9022	0.0008	*0.000151*	*0.00005*	0.00060	*18.8*	*5.7*	75.5
Portugal	0.9002	0.9014	0.0011	*0.000077*	*0.00005*	0.00102	*6.7*	*4.1*	89.2
Korea, Republic of	0.8961	0.8978	0.0017	*0.000135*	0.00016	0.00143	*7.8*	9.4	82.8
Cyprus	0.8844	0.8860	0.0016	*0.000000*	0.00004	0.00154	*0.0*	2.6	97.4
Barbados	0.8755	0.8764	0.0009	*0.000125*	0.00010	0.00068	*13.9*	10.7	75.4
Czech Republic	0.8719	0.8725	0.0006	*0.000056*	*0.00000*	0.00054	*9.3*	*0.3*	90.4

Table 1. Continued.

	GDI	HDI	HDI – GDI	Life expectancy penalty	Education penalty	Earned income penalty	Share life expectancy penalty (%)	Share education penalty (%)	Share earned income penalty (%)
Malta	0.8585	0.8610	0.0025	0.000001	*0.00006*	0.00246	0.0	*2.4*	97.5
Hungary	0.8597	0.8607	0.0010	*0.000312*	*0.00003*	0.00063	*31.8*	*3.5*	64.7
Argentina	0.8537	0.8568	0.0031	*0.000175*	*0.00007*	0.00288	*5.6*	*2.4*	92.0
Poland	0.8558	0.8568	0.0010	*0.000280*	*0.00003*	0.00067	*28.3*	*3.4*	68.3
Estonia	0.8516	0.8535	0.0019	*0.001240*	*0.00014*	0.00055	*64.3*	*7.0*	28.7
Lithuania	0.8506	0.8522	0.0016	*0.001135*	*0.00006*	0.00042	*70.1*	*3.7*	26.2
Chile	0.8457	0.8485	0.0028	*0.000027*	0.00000	0.00277	*1.0*	0.1	99.0
Slovakia	0.8470	0.8477	0.0008	*0.000231*	*0.00000*	0.00053	*30.1*	*0.5*	69.4
Kuwait	0.8428	0.8459	0.0031	0.000013	*0.00001*	0.00304	0.4	*0.3*	99.3
Bahrain	0.8365	0.8407	0.0042	0.000133	0.00013	0.00389	3.2	3.2	93.6
Croatia	0.8371	0.8383	0.0011	*0.000116*	0.00000	0.00099	*10.4*	0.1	89.4
Uruguay	0.8360	0.8376	0.0016	*0.000150*	*0.00014*	0.00131	*9.4*	*8.8*	81.8
Latvia	0.8337	0.8356	0.0019	*0.001132*	*0.00011*	0.00066	*59.5*	*5.8*	34.6
Costa Rica	0.8295	0.8325	0.0030	0.000002	*0.00000*	0.00303	0.1	*0.1*	99.8
Bulgaria	0.8071	0.8077	0.0006	*0.000088*	0.00000	0.00053	*14.2*	0.3	85.5
Mexico	0.8043	0.8073	0.0030	0.000000	0.00003	0.00302	0.0	1.0	99.0
Panama	0.7997	0.8013	0.0016	*0.000000*	*0.00002*	0.00154	*0.0*	*1.0*	99.0
Trinidad & Tobago	0.7958	0.7977	0.0019	*0.000033*	*0.00000*	0.00183	*1.8*	*0.1*	98.2
Macedonia	0.7935	0.7947	0.0012	0.000000	0.00005	0.00114	0.0	4.3	95.7
Malaysia	0.7914	0.7933	0.0018	0.000003	0.00009	0.00175	0.2	4.8	95.0
Romania	0.7892	0.7903	0.0011	*0.000149*	0.00000	0.00095	*13.5*	0.1	86.5
Brazil	0.7855	0.7881	0.0026	*0.000268*	*0.00002*	0.00233	*10.2*	*0.8*	88.9
Belarus	0.7848	0.7868	0.0020	*0.001406*	*0.00003*	0.00061	*68.6*	*1.4*	29.9
Mauritius	0.7814	0.7848	0.0034	*0.000105*	0.00026	0.00304	*3.1*	7.6	89.3
Colombia	0.7803	0.7818	0.0016	*0.000034*	*0.00002*	0.00150	*2.2*	*1.4*	96.4
Albania	0.7761	0.7774	0.0013	*0.000017*	*0.00000*	0.00124	*1.4*	*0.0*	98.6
Thailand	0.7743	0.7753	0.0011	*0.000200*	0.00007	0.00078	*19.0*	7.0	74.0
Oman	0.7591	0.7694	0.0103	0.000127	0.00142	0.00875	1.2	13.8	85.0
Venezuela	0.7648	0.7677	0.0028	*0.000024*	*0.00000*	0.00280	*0.9*	*0.1*	99.0
Ukraine	0.7631	0.7663	0.0032	*0.001803*	*0.00001*	0.00138	*56.4*	*0.3*	43.3

Table 1. Continued.

	GDI	HDI	HDI – GDI	Life expectancy penalty	Education penalty	Earned income penalty	Share life expectancy penalty (%)	Share education penalty (%)	Share earned income penalty (%)
Kazakhstan	0.7585	0.7606	0.0021	*0.001401*	*0.00002*	0.00068	*66.7*	*0.8*	32.4
Saudi Arabia	0.7488	0.7579	0.0091	0.000038	0.00179	0.00728	0.4	19.6	80.0
Armenia	0.7563	0.7570	0.0006	*0.000090*	*0.00003*	0.00051	*14.5*	*4.2*	81.3
Philippines	0.7554	0.7564	0.0010	0.000018	*0.00001*	0.00101	1.7	*1.3*	96.9
China	0.7535	0.7546	0.0011	0.000058	0.00042	0.00061	5.4	38.9	55.7
Peru	0.7449	0.7518	0.0069	*0.000000*	0.00053	0.00634	*0.0*	7.8	92.2
Lebanon	0.7448	0.7502	0.0054	0.000014	0.00043	0.00498	0.3	7.9	91.8
Sri Lanka	0.7474	0.7491	0.0017	*0.000003*	0.00003	0.00171	*0.2*	1.6	98.3
Tunisia	0.7426	0.7474	0.0047	0.000021	0.00137	0.00335	0.4	29.0	70.6
Paraguay	0.7419	0.7465	0.0046	0.000007	0.00003	0.00461	0.1	0.5	99.3
Turkey	0.7425	0.7464	0.0040	0.000005	0.00193	0.00202	0.1	48.8	51.1
Fiji	0.7424	0.7459	0.0036	0.000012	0.00004	0.00351	0.3	1.0	98.7
Jordan	0.7395	0.7454	0.0059	0.000125	0.00038	0.00539	2.1	6.5	91.4
Dominican Republic	0.7392	0.7429	0.0037	*0.000149*	*0.00009*	0.00350	*4.0*	*2.3*	93.7
Belize	0.7336	0.7406	0.0070	0.000000	*0.00001*	0.00701	0.0	*0.1*	99.9
Jamaica	0.7357	0.7369	0.0012	0.000061	*0.00050*	0.00063	5.1	*42.0*	52.9
Iran	0.7195	0.7264	0.0069	0.000130	0.00134	0.00541	1.9	19.5	78.6
Azerbaijan	0.7250	0.7263	0.0013	*0.000175*	0.00002	0.00113	*13.2*	1.8	85.0
Guyana	0.7158	0.7191	0.0033	*0.000041*	0.00000	0.00328	*1.2*	0.0	98.8
El Salvador	0.7149	0.7176	0.0027	*0.000032*	0.00018	0.00248	*1.2*	6.6	92.2
Cape Verde	0.7137	0.7172	0.0035	*0.000045*	0.00150	0.00196	*1.3*	42.8	55.9
Algeria	0.7062	0.7134	0.0072	0.000181	0.00231	0.00476	2.5	31.9	65.6
Syria	0.7020	0.7102	0.0082	0.000063	0.00176	0.00643	0.8	21.3	77.9
Viet Nam	0.7021	0.7032	0.0011	0.000029	0.00043	0.00063	2.7	39.6	57.8
Kyrgyzstan	0.6999	0.7011	0.0013	*0.000386*	*0.00000*	0.00089	*30.2*	0.1	69.7
Indonesia	0.6914	0.6937	0.0023	0.000037	0.00049	0.00176	1.6	21.4	77.0
Uzbekistan	0.6920	0.6929	0.0009	*0.000066*	0.00001	0.00085	*7.2*	0.8	92.0
Nicaragua	0.6827	0.6854	0.0027	0.000002	*0.00001*	0.00264	0.1	*0.3*	99.7
Bolivia	0.6790	0.6828	0.0038	0.000023	*0.00104*	0.00276	0.6	*27.2*	72.2
Mongolia	0.6775	0.6784	0.0009	0.000033	*0.00011*	0.00081	3.5	*11.6*	84.9

Table 1. Continued.

	GDI	HDI	HDI – GDI	Life expectancy penalty	Education penalty	Earned income penalty	Share life expectancy penalty (%)	Share education penalty (%)	Share earned income penalty (%)
Moldova, Republic of	0.6684	0.6696	0.0011	*0.000177*	0.00000	0.00096	*15.6*	0.1	84.3
Guatemala	0.6490	0.6550	0.0060	*0.000192*	0.00117	0.00464	*3.2*	19.4	77.4
South Africa	0.6517	0.6538	0.0021	0.000152	0.00005	0.00189	7.3	2.3	90.4
Tajikistan	0.6500	0.6515	0.0015	*0.000003*	0.00018	0.00129	*0.2*	12.1	87.7
Equatorial Guinea	0.6410	0.6465	0.0055	0.001071	0.00215	0.00229	19.4	39.0	41.6
Morocco	0.6163	0.6253	0.0090	0.000011	0.00581	0.00319	0.1	64.4	35.4
Namibia	0.6212	0.6235	0.0023	0.000771	0.00003	0.00154	32.9	1.1	66.0
India	0.5865	0.5961	0.0096	0.000124	0.00541	0.00404	1.3	56.5	42.2
Cambodia	0.5669	0.5710	0.0042	*0.000266*	0.00356	0.00034	*6.4*	85.6	8.0
Botswana	0.5592	0.5623	0.0031	0.002135	*0.00017*	0.00076	69.8	*5.5*	24.7
Comoros	0.5406	0.5449	0.0043	0.000021	0.00251	0.00177	0.5	58.4	41.1
Laos	0.5401	0.5440	0.0039	0.000293	0.00273	0.00089	7.5	69.8	22.7
Pakistan	0.5080	0.5232	0.0152	0.000769	0.00881	0.00561	5.1	58.0	36.9
Nepal	0.5114	0.5222	0.0108	0.000672	0.00768	0.00246	6.2	71.0	22.8
Papua New Guinea	0.5178	0.5216	0.0038	0.000688	0.00176	0.00134	18.2	46.5	35.3
Ghana	0.5168	0.5207	0.0039	0.000717	0.00283	0.00039	18.2	72.0	9.8
Bangladesh	0.5136	0.5184	0.0049	0.000428	0.00260	0.00183	8.8	53.5	37.7
Congo	0.5070	0.5108	0.0037	0.000331	0.00127	0.00215	8.8	33.8	57.4
Uganda	0.5025	0.5068	0.0044	0.001150	0.00235	0.00085	26.4	53.9	19.6
Togo	0.4912	0.5056	0.0144	0.000054	0.01151	0.00285	0.4	79.9	19.7
Sudan	0.4947	0.5049	0.0103	0.000186	0.00350	0.00656	1.8	34.2	64.0
Zimbabwe	0.4931	0.4987	0.0056	0.003874	0.00036	0.00135	69.4	6.4	24.2
Cameroon	0.4872	0.4939	0.0067	0.000880	0.00278	0.00305	13.1	41.5	45.4
Lesotho	0.4868	0.4925	0.0057	0.000446	*0.00153*	0.00377	7.8	*26.6*	65.6
Swaziland	0.4847	0.4914	0.0067	0.003274	0.00009	0.00334	48.8	1.3	49.8
Madagascar	0.4830	0.4859	0.0030	0.000241	0.00088	0.00184	8.2	29.6	62.2
Yemen	0.4484	0.4805	0.0321	0.000213	0.02210	0.00974	0.7	68.9	30.4
Mauritania	0.4713	0.4755	0.0043	0.000163	0.00244	0.00169	3.8	56.8	39.5
Kenya	0.4718	0.4752	0.0034	0.002888	0.00049	0.00003	84.8	14.3	1.0
Gambia	0.4642	0.4683	0.0041	0.000204	0.00258	0.00130	5.0	63.2	31.8
Senegal	0.4490	0.4568	0.0078	0.000299	0.00572	0.00178	3.8	73.3	22.9

Table 1. Continued.

	GDI	HDI	HDI – GDI	Life expectancy penalty	Education penalty	Earned income penalty	Share life expectancy penalty (%)	Share education penalty (%)	Share earned income penalty (%)
Rwanda	0.4468	0.4495	0.0027	0.000179	0.00124	0.00123	6.7	46.8	46.5
Nigeria	0.4392	0.4483	0.0092	0.001581	0.00270	0.00488	17.3	29.5	53.3
Angola	0.4376	0.4453	0.0077	0.000361	0.00631	0.00101	4.7	82.1	13.2
Eritrea	0.4310	0.4398	0.0087	0.000066	0.00572	0.00293	0.8	65.6	33.6
Benin	0.4192	0.4318	0.0126	0.000570	0.01124	0.00079	4.5	89.2	6.3
Tanzania	0.4138	0.4175	0.0037	0.001180	0.00166	0.00089	31.7	44.5	23.8
Côte d'Ivoire	0.4031	0.4165	0.0134	0.000782	0.00721	0.00538	5.8	53.9	40.2
Malawi	0.3960	0.4028	0.0068	0.002482	0.00315	0.00118	36.4	46.3	17.3
Zambia	0.3831	0.3915	0.0084	0.004016	0.00214	0.00223	47.8	25.5	26.6
Congo Democratic Republic	0.3731	0.3831	0.0100	0.000683	0.00677	0.00255	6.8	67.7	25.5
Mozambique	0.3647	0.3770	0.0123	0.000940	0.01047	0.00087	7.7	85.3	7.1
Burundi	0.3728	0.3770	0.0042	0.000715	0.00266	0.00081	17.1	63.6	19.4
Ethiopia	0.3552	0.3634	0.0081	0.000525	0.00456	0.00306	6.4	56.0	37.6
Guinea-Bissau	0.3262	0.3443	0.0181	0.000287	0.01398	0.00381	1.6	77.4	21.1
Chad	0.3218	0.3412	0.0195	0.000573	0.01735	0.00155	2.9	89.1	8.0
Mali	0.3225	0.3316	0.0091	0.000828	0.00661	0.00165	9.1	72.7	18.2
Burkina Faso	0.3110	0.3169	0.0060	0.000799	0.00461	0.00058	13.3	76.9	9.7
Sierra Leone	0.2792	0.2937	0.0145	0.000449	0.00743	0.00659	3.1	51.4	45.5
Niger	0.2713	0.2797	0.0084	0.001711	0.00450	0.00214	20.5	53.9	25.6
Average	0.6971	0.7013	0.0042	0.000394	0.00176	0.00208	11.6	22.4	66.0

Note: The HDI is calculated based on weighted achievements for males and females, and therefore differs from the published HDI due to rounding errors. Countries sorted according to the HDI. Italics indicate that the life expectancy or education gap is favouring females. *Source*: UNDP (2005).

reflect gender gaps in consumption of human development-related goods. This is probably the most severly undermines of the index and seriously questions its usefulness. While one could try to fix this high dependence of the total penalty for gender inequality on the earned income component by changing the calculation of the indices for the three components or differentiate the aversion to inequality in the three components, the serious conceptual flaws would remain even if they would now be less important for the GDI.[21]

Fourth, there are quite a few countries where the total penalty for gender inequality is indeed generated by cumulating gender gaps in opposite directions. As shown in Table 1, in 62 countries the life expectancy gap is favouring females (see figures in italics in the life expectancy penalty column), and in 33 of these countries the education gap is also favouring females, while in the earned income component all gender gaps are favouring males. (see figures in italics in the education penalty column)

Apart from these empirical problems, there are serious data issues that have to be raised (which have already been discussed in Bardhan and Klasen, 1999). In order to calculate the GDI, the HDRO has to make a number of heroic and highly implausible assumptions. This is particularly the case for the earned income component. In order to calculate earned incomes, it uses the non-agricultural wage ratio and assumes that it applies in the entire economy. Given the small size of the non-agricultural formal sector in many developing countries, this is highly debatable. Second, for many countries, it uses a ratio of 0.75 for lack of data, which is quite arbitrary, so that the earned income ratio is largely driven by differences in labour force participation rates. Third, the data on these crucial labour force participation rates are quite weak and often not comparable across countries.

Thus the earned income component is suffering not only from serious conceptual flaws, but also is based on highly shaky and dubious data and assumptions. I later make a few suggestions about ways to address some of these issues.

The Gender Empowerment Measure

The GEM is meant to measure ''whether women and men are able to actively participate in economic and political life and take part in decision-making'' (UNDP, 1995, p. 73). To use the distinction used by Sen (for example, Sen, 1998), it focuses on agency concerns rather than well-being concerns. Three dimensions are chosen to measure these agency aspects. The first is female representation in national parliaments as an indicator of political representation. The second is representation in the senior positions in the economy, proxied by female representation as legislators, senior officials, and mangers, and representation as professional and technical workers. Finally, the third dimension uses earned incomes of

males and females (without a logarithmic transformation that it used for the HDI and the GDI) to measure power over economic resources.

The way the measure is implemented is rather peculiar and, in contrast to the GDI, not grounded in a clear conceptual framework that is used in the inequality literature. For the first two components (female representation in political decision-making and in the economy), the actual female and male shares are used, then the aversion to inequality penalty is applied using the same value of ε, and then the resulting measure is compared with 50%, the ''ideal'' representation of males and females. So all that matters are relative shares between males and females and differences in these shares attract a penalty, which is increasing non-linearly in the difference in these shares.

The treatment of the earned income component is different. Here male and female income levels are calculated based on their non-agricultural wages and their labour force participation, then they are turned into index values using the standard procedure used for all components of the HDI and GDI, and then the mean adjusted by inequality aversion is calculated (see annex to guest editor's introduction of this special issue). The procedure for the earned income component is thus identical for the GDI and the GEM, except that the GEM uses the income directly while the GDI first makes a logarithmic transformation. In contrast to the first two components of the GEM, which are purely a measure of relative participation of males and females, the earned income component measures gender-inequality adjusted overall income levels. Due to this, a poor country can never achieve a high value for the GEM even if it had equality of earned incomes. Conversely, a rich country might do well in the GEM either because the gender gaps in political decision-making, representation in the economy, or in earned incomes are low, or because the country is simply rich, which raises its GEM value due to the earned income component.

Conceptual issues and problems with the GEM

A first issue one might want to raise is whether the three components chosen and the indicators selected are good ways to represent gender gaps in agency. Given the overall constraints that such measures are forced to comply with (as discussed earlier), I think the three components are not too bad. There are some problems, however. First, it appears that there is a serious elite bias in at least the first two components. Participation of women in grass-roots organizations or at the local level is not reflected, nor is female employment at lower levels of the employment hierarchy (including the informal sector).[22] This is an issue that should be investigated closer and alternatives should be considered (see Cueva's contribution in this *JHD* special issue).

The earned income component does appear to be appropriate as an indicator of empowerment consistent with a vast literature that shows

earned incomes affect decision-making (for example, see Sen, 1990; Haddad *et al*., 1997; World Bank, 2001) and thus earned incomes do reflect control over resources (even if they do not reflect consumption of resources, as argued earlier).

But the way this measure is implemented generates some serious questions.[23] Let me first turn to the first two components. Using the same procedure to calculate a mean adjusted for inequality aversion for male and female shares in parliament and the senior positions in the economy is a bit peculiar, as the mean shares by definition are 50% for both sexes (or actually their share in the population, which is close to 50%), and so the idea of calculating such a mean achievement before adjusting it downward for inequality seems a bit odd and somewhat redundant. Presumably, the reason for proceeding was to make it similar to GDI and to also ensure that gaps favouring males or females receive a symmetric treatment (as they do in the GDI). Such symmetric treatment is harder to achieve when the female-to-male ratio of the shares are used as the indicator of the gap, which might otherwise be a more plausible way to proceed. But this symmetric treatment of gaps favouring males or females leads to the previously discussed problem of cumulating gaps in the three dimensions that go in opposite directions and treating them the same as gaps favouring males (or females) in all dimensions. Also here, it might be better to allow for trade-offs and compensation.

More seriously, it is entirely unclear why the earned income component should not be purely based on income shares but on income levels. The GEM, in my view, is a measure of relative agency for males and females, and, if it is meant to be such a measure, it does not make sense to use absolute income levels. Relative control over economic resources is, in my view, driven entirely by relative incomes, but not by absolute incomes. Moreover, is it really intended to imply that equity in agency can only happen in richer countries? If so, that would require a vigorous defence and justification.[24]

Empirical issues and problems with the GEM

Two main empirical problems arise with the GEM. The first is that its coverage is quite low due to unavailability of data for the three components. The 2005 report only produces a GEM for 80 countries, compared with the HDI that is produced for 177 countries (and 140 countries for the GDI). The real bottleneck appears to be data on female and male shares in economic decision-making. This is an issue that requires urgent attention, as the low coverage seriously undermines the usefulness of the measure. Also, comparative rankings between the GEM and the GDI or HDI are therefore highly misleading, another important source of misinterpretation (see Schüler's contribution in this *JHD* special issue). The second empirical problem relates to the earned income component, where all the problematic data assumptions

already discussed in the context of the GDI also apply. Finally, the problem of gaps going in different directions is also present here. In fact, it is more serious than it was in the GDI as there are larger gaps in opposite directions in more countries, so the interpretation of the GEM requires careful scrutiny of the underlying gender gaps in each component (see later).

Possible ways forward

From the presented discussion, three points are of particular importance. First, there appears to be a great demand for an indicator of gender gaps in human development that is currently not met. Second, the GDI is a useful distribution-sensitive measure but suffers from the serious conceptual and empirical problems of the earned income component. Third, the GEM present two main drawbacks: it implicitly makes the implausible assumption that equity in agency can only be achieved in rich countries, and its application of the inequality aversion procedure seems odd and redundant when applied to shares (in political and economic decision-making) rather than achievements. The following suggestions will try to address these three issues. In the conclusion, I will then also add a list of other issues one might want to address, dealing with some of the other points raised earlier.

What to do with the GDI?

Given the earlier discussion, I believe it is not useful to continue reporting the GDI as the main indicator for gender-related human development. It is frequently misunderstood and it is beset with serious conceptual and empirical problems. At the same time, it would be useful to re-consider a revised GDI within a range of distribution-sensitive HDIs. Here a revised GDI could play a useful role alongside other distribution-sensitive HDIs that consider the human development impact of regional inequality ethnic inequality, or income inequality (using quintiles). They could all use the same overall procedure; that is, adjusting the components of the HDI downwards by an inequality aversion parameter attached to these various gaps. In that context, the function of the GDI would be much more apparent and would usefully add to the debate about distribution-sensitive development.

But even if this were to be done, one would still have to address the serious conceptual problem with the earned income component. Here one could proceed along two lines:

- Produce an HDI and distribution-adjusted HDIs (such as the GDI or a regional inequality adjusted HDI, etc.) only for the first two components (i.e. life expectancy and education components). To magnify the gaps, I would encourage the UNDP to think about a higher inequality aversion parameter for the life expectancy component.

- Produce the HDI and GDI and other distribution-sensitive measures as they are now but add a further transformation to the gender gaps in earned incomes. For example, after calculating the income index for males and females (which are based on log male and female incomes) one might simply halve the difference between the male and female indices in the earned income indices, which would probably better reflect the inequalities in human-development-related consumption. Clearly such transformations would be entirely arbitrary, and all I can refer to by way of defence is Sen's dictum that it is better to be vaguely right than precisely wrong on this matter.

Producing an HDI for males and females separately

While the GDI would better be seen in the context of a range of distribution-sensitive HDIs, it would still be useful to have a measure of gender-disaggregated human development (without using the inequality aversion procedure that leads to the very small differences between the GDI and the HDI). One simple, but potentially powerful, way to proceed would be to simply calculate a separate HDI for males and females. With the education and longevity components, this would be straightforward; with the earned income component, the problem remains that using simply female and male earned incomes overstates differences in human-development-related consumptions. In Table 2 I have therefore used the procedure suggested above (i.e. halving the difference between the male and female earned income indices) to construct such a male HDI and a female HDI.[25] The results appear to be very plausible and seem much easier to interpret than those for the GDI. For a number of countries, including India, Angola, Chad, Cote d'Ivoire, Guinea-Bissau, Pakistan, and Yemen, the female HDI is over 0.100 lower than the male HDI, denoting significant gender gaps. Thus this might be a useful way forward, although some of the problems raised earlier, including the small role of for life expectancy gaps and the weak database for the earned income component, remain.

Producing an index of gender gaps in human development

Another way to proceed would be to produce an index of gender gaps in human development. This index would be much more easily interpretable than the GDI and would also fill the clear demand for such a measure. A potential disadvantage is that there exist already a plethora of such composite gender gap measures that take the average of gender gaps in different dimensions (see note 3), so that the value added of producing another one might not be so large. To circumvent this potential problem, it would be useful if the measure was, at least loosely, related to the HDI and thus focused on gender inequality in human development. In addition, it should capitalize on all the other advantages of the UNDP

Table 2. Index of gender gaps in human development, and male and female HDIs, for 2003

	Gender gap index (shares)	Gender gap index (ratios)	Female HDI	Male HDI	GDI	HDI
Albania	0.9342	0.9197	0.7720	0.7829	0.7761	0.7774
Algeria	0.7134	0.7262	0.6665	0.7592	0.7062	0.7134
Angola	0.8185	0.7956	0.3996	0.4925	0.4376	0.4453
Argentina	0.8922	0.8542	0.8553	0.8591	0.8537	0.8568
Armenia	1.1179	0.9824	0.7597	0.7545	0.7563	0.7570
Australia	0.9550	0.9308	0.9498	0.9582	0.9536	0.9539
Austria	0.9377	0.8941	0.9183	0.9406	0.9261	0.9288
Azerbaijan	0.9854	0.9330	0.7229	0.7303	0.7250	0.7263
Bahrain	0.5770	0.7712	0.8055	0.8629	0.8365	0.8407
Bangladesh	0.7774	0.8138	0.4797	0.5550	0.5136	0.5184
Barbados	1.0269	0.9596	0.8810	0.8720	0.8755	0.8764
Belarus	1.1382	1.0017	0.8017	0.7707	0.7848	0.7868
Belgium	0.9327	0.8978	0.9370	0.9473	0.9409	0.9419
Belize	0.7637	0.7803	0.7218	0.7585	0.7336	0.7406
Benin	0.7730	0.7811	0.3775	0.4855	0.4192	0.4318
Bolivia	0.8221	0.8156	0.6524	0.7135	0.6790	0.6828
Botswana	0.8674	0.8336	0.5507	0.5745	0.5592	0.5623
Brazil	0.8918	0.8681	0.7873	0.7893	0.7855	0.7881
Bulgaria	1.0199	0.9607	0.8063	0.8096	0.8071	0.8077
Burkina Faso	0.7462	0.7517	0.2864	0.3473	0.3110	0.3169
Burundi	0.8852	0.8381	0.3435	0.4126	0.3728	0.3770
Cambodia	1.0110	0.9434	0.5463	0.5978	0.5669	0.5710
Cameroon	0.7506	0.7414	0.4486	0.5400	0.4872	0.4939
Canada	0.9650	0.9477	0.9429	0.9513	0.9465	0.9470
Cape Verde	0.8797	0.8077	0.6923	0.7453	0.7137	0.7172
Chad	0.6974	0.6818	0.2849	0.3990	0.3218	0.3412
Chile	0.8558	0.8379	0.8375	0.8600	0.8457	0.8485
China	0.8688	0.9185	0.7334	0.7744	0.7535	0.7546
Colombia	0.9085	0.8869	0.7782	0.7857	0.7803	0.7818
Comoros	0.8273	0.8324	0.5133	0.5763	0.5406	0.5449
Congo	0.8433	0.8280	0.4786	0.5437	0.5070	0.5108
Congo Democratic Republic	0.7604	0.7468	0.3325	0.4348	0.3731	0.3831
Costa Rica	0.7969	0.8243	0.8188	0.8453	0.8295	0.8325
Côte d'Ivoire	0.6437	0.6684	0.3583	0.4720	0.4031	0.4165
Croatia	0.9973	0.9258	0.8356	0.8417	0.8371	0.8383
Cyprus	0.9111	0.8691	0.8726	0.9005	0.8844	0.8860
Czech Republic	1.0065	0.9546	0.8712	0.8741	0.8719	0.8725
Denmark	0.9709	0.9505	0.9346	0.9426	0.9383	0.9385
Dominican Republic	NA	NA	0.7395	0.7459	0.7392	0.7429
El Salvador	0.8737	0.8437	0.7028	0.7333	0.7149	0.7176
Equatorial Guinea	0.7395	0.7222	0.6003	0.6941	0.6410	0.6465
Eritrea	0.8725	0.8385	0.3975	0.4841	0.4310	0.4398
Estonia	1.1776	1.0037	0.8709	0.8343	0.8516	0.8535
Ethiopia	0.7536	0.7449	0.3220	0.4053	0.3552	0.3634
Fiji	0.7916	0.8180	0.7266	0.7641	0.7424	0.7459
Finland	1.0111	0.9673	0.9401	0.9399	0.9395	0.9399
France	0.9959	0.9450	0.9370	0.9351	0.9351	0.9359
Gambia	0.8387	0.8239	0.4367	0.5005	0.4642	0.4683
Germany	0.9512	0.9072	0.9204	0.9342	0.9259	0.9269
Ghana	0.8575	0.8775	0.4829	0.5576	0.5168	0.5207

Table 2. Continued.

	Gender gap index (shares)	Gender gap index (ratios)	Female HDI	Male HDI	GDI	HDI
Greece	0.8922	0.8713	0.8998	0.9174	0.9067	0.9084
Guatemala	0.8260	0.7878	0.6313	0.6806	0.6490	0.6550
Guinea-Bissau	0.6967	0.6793	0.2868	0.4035	0.3262	0.3443
Guyana	0.8977	0.8457	0.7096	0.7299	0.7158	0.7191
Hong Kong, China	0.9661	0.8725	0.8996	0.9282	0.9116	0.9127
Hungary	1.0301	0.9373	0.8665	0.8549	0.8597	0.8607
Iceland	0.9462	0.9472	0.9503	0.9568	0.9531	0.9536
India	0.6862	0.7239	0.5428	0.6458	0.5865	0.5961
Indonesia	0.8626	0.8611	0.6702	0.7174	0.6914	0.6937
Iran	0.7144	0.7361	0.6841	0.7669	0.7195	0.7264
Ireland	0.8677	0.8578	0.9344	0.9485	0.9394	0.9413
Israel	0.9102	0.8897	0.9009	0.9242	0.9114	0.9124
Italy	0.9323	0.8790	0.9249	0.9354	0.9281	0.9297
Jamaica	0.9974	0.9728	0.7391	0.7347	0.7357	0.7369
Japan	0.9438	0.9030	0.9330	0.9456	0.9373	0.9389
Jordan	0.6906	0.7487	0.7110	0.7760	0.7395	0.7454
Kazakhstan	1.0879	1.0037	0.7736	0.7471	0.7585	0.7606
Kenya	0.8326	0.8317	0.4449	0.5055	0.4718	0.4752
Korea, Republic of	0.8962	0.9035	0.8866	0.9088	0.8961	0.8978
Kuwait	0.5440	0.8291	0.8245	0.8549	0.8428	0.8459
Kyrgyzstan	1.0092	0.9793	0.7052	0.6972	0.6999	0.7011
Laos	0.8566	0.8564	0.5066	0.5814	0.5401	0.5440
Latvia	1.1777	0.9934	0.8513	0.8183	0.8337	0.8356
Lebanon	0.8013	0.7701	0.7221	0.7802	0.7448	0.7502
Lesotho	0.9885	0.8568	0.4948	0.4919	0.4868	0.4925
Lithuania	1.1301	0.9894	0.8678	0.8352	0.8506	0.8522
Luxembourg	0.8964	0.8704	0.9468	0.9414	0.9440	0.9441
Macedonia, TFYR	0.9034	0.9008	0.7826	0.8069	0.7935	0.7947
Madagascar	0.8706	0.8613	0.4591	0.5131	0.4830	0.4859
Malawi	0.8116	0.7967	0.3571	0.4495	0.3960	0.4028
Malaysia	0.8332	0.8592	0.7765	0.8092	0.7914	0.7933
Mali	0.7368	0.7305	0.2915	0.3721	0.3225	0.3316
Malta	0.8162	0.8023	0.8517	0.8707	0.8585	0.8610
Mauritania	0.8400	0.8200	0.4428	0.5093	0.4713	0.4755
Mauritius	0.8336	0.8234	0.7679	0.8020	0.7814	0.7848
Mexico	0.8586	0.8224	0.7911	0.8249	0.8043	0.8073
Moldova, Republic of	1.0527	0.9639	0.6696	0.6701	0.6684	0.6696
Mongolia	0.9620	0.9649	0.6758	0.6810	0.6775	0.6784
Morocco	0.7449	0.7368	0.5792	0.6721	0.6163	0.6253
Mozambique	0.8295	0.7733	0.3243	0.4340	0.3647	0.3770
Namibia	0.8548	0.8391	0.6019	0.6458	0.6212	0.6235
Nepal	0.7505	0.7383	0.4649	0.5807	0.5114	0.5222
Netherlands	0.9091	0.8952	0.9324	0.9483	0.9393	0.9402
New Zealand	0.9757	0.9403	0.9256	0.9326	0.9285	0.9289
Nicaragua	0.8631	0.8617	0.6748	0.6960	0.6827	0.6854
Niger	0.6651	0.6948	0.2415	0.3159	0.2713	0.2797
Nigeria	0.6982	0.7131	0.3983	0.4971	0.4392	0.4483
Norway	0.9720	0.9575	0.9585	0.9626	0.9603	0.9605
Oman	0.5244	0.6941	0.7119	0.8072	0.7591	0.7694
Pakistan	0.6086	0.6453	0.4570	0.5847	0.5080	0.5232
Panama	0.8432	0.8590	0.7941	0.8081	0.7997	0.8013

Table 2. Continued.

	Gender gap index (shares)	Gender gap index (ratios)	Female HDI	Male HDI	GDI	HDI
Papua New Guinea	0.7775	0.8288	0.4843	0.5561	0.5178	0.5216
Paraguay	0.7916	0.8037	0.7269	0.7656	0.7419	0.7465
Peru	0.7811	0.7901	0.7211	0.7819	0.7449	0.7518
Philippines	0.8602	0.8723	0.7490	0.7637	0.7554	0.7564
Poland	1.0240	0.9655	0.8622	0.8515	0.8558	0.8568
Portugal	0.9911	0.9259	0.9017	0.9016	0.9002	0.9014
Romania	0.9818	0.9351	0.7886	0.7924	0.7892	0.7903
Rwanda	0.9439	0.8853	0.4236	0.4774	0.4468	0.4495
Saudi Arabia	0.5967	0.7021	0.7073	0.7977	0.7488	0.7579
Senegal	0.7911	0.7653	0.4146	0.5008	0.4490	0.4568
Sierra Leone	0.6904	0.6710	0.2465	0.3425	0.2792	0.2937
Slovakia	1.0268	0.9690	0.8508	0.8449	0.8470	0.8477
Slovenia	1.0079	0.9603	0.9060	0.8985	0.9014	0.9022
South Africa	0.8635	0.8325	0.6353	0.6734	0.6517	0.6538
Spain	0.9135	0.8808	0.9222	0.9259	0.9219	0.9238
Sri Lanka	0.8200	0.8490	0.7377	0.7598	0.7474	0.7491
Sudan	0.6941	0.7029	0.4581	0.5509	0.4947	0.5049
Swaziland	0.7365	0.6806	0.4634	0.5227	0.4847	0.4914
Sweden	0.9807	0.9636	0.9410	0.9541	0.9471	0.9474
Switzerland	0.9455	0.8894	0.9446	0.9482	0.9463	0.9463
Syria	0.7228	0.7320	0.6673	0.7524	0.7020	0.7102
Tajikistan	0.9294	0.9233	0.6384	0.6647	0.6500	0.6515
Tanzania	0.8710	0.8600	0.3831	0.4525	0.4138	0.4175
Thailand	0.9907	0.9588	0.7712	0.7799	0.7743	0.7753
Togo	0.7480	0.7294	0.4463	0.5667	0.4912	0.5056
Trinidad and Tobago	0.8968	0.8759	0.7906	0.8052	0.7958	0.7977
Tunisia	0.7623	0.7747	0.7123	0.7817	0.7426	0.7474
Turkey	0.8084	0.8221	0.7113	0.7808	0.7425	0.7464
Uganda	0.8414	0.8408	0.4658	0.5479	0.5025	0.5068
Ukraine	1.1766	1.0021	0.7793	0.7526	0.7631	0.7663
United Kingdom	0.9642	0.9178	0.9300	0.9454	0.9367	0.9373
United States	0.9872	0.9549	0.9418	0.9440	0.9422	0.9427
Uruguay	0.9808	0.9235	0.8419	0.8335	0.8360	0.8376
Uzbekistan	0.9720	0.9614	0.6895	0.6964	0.6920	0.6929
Venezuela	0.8493	0.8590	0.7590	0.7761	0.7648	0.7677
Viet Nam	0.9399	0.9374	0.6844	0.7220	0.7021	0.7032
Yemen	0.5754	0.5923	0.3950	0.5630	0.4484	0.4805
Zambia	0.7225	0.7218	0.3459	0.4373	0.3831	0.3915
Zimbabwe	0.7896	0.7728	0.4658	0.5325	0.4931	0.4987
Average	0.8685	0.8496	0.6812	0.7211	0.6971	0.7013

Note: The HDI is calculated based on weighted achievements and differs from the published HDI due to rounding errors. For the definition and calculation of the measures, see text. *Source*: UNDP (2005).

measures; namely, their ease of interpretation, focus on three important dimensions, wide coverage, clear policy message, and annual updates.

To keep the measure loosely related to the HDI, it would include gender gaps in the index of longevity and education as the first two components. Due to the problematic nature of the earned income

component, the proposal here is to follow Dijkstra (2002; and her contribution in the current *JHD* special issue) and use as the third component female labour force participation rates. Being able to participate in the labour force is an important ''freedom'' to enjoy, and in this achievement there are substantial gender gaps, thus constituting a plausibly alternative to the third component in replacement of the problematic earned income component. In Table 2, two such gender gap indices are produced (based on the index values for the achievement in each component): one applies the ratio of the female to the male share of total achievement in each component, and the other applies the ratio of male and female achievements directly. Although empirically the difference between the two is relatively small in most countries, the latter is conceptually to be preferred as it is not distorted by unequal female and male population shares (see earlier). A few issues are worth noting here. First, it is entirely possible for the female–male ratio of achievements to exceed one in one component, or even in the entire measure. In particular, in many transition countries, the ratio of female-to-male life expectancy achievement exceeds the value one as women outlive men by much more than five years. Also, females have slight advantages in education. Values higher than one in these two components are then averaged with values lower than one in the earned income component. The implicit assumption is that the female longevity and education advantages can compensate for the disadvantages in labour force participation. While possibly preferable to the implicit accumulation of gender gaps in opposite directions in the GDI (see earlier), allowing for full compensation is also a debatable assumption and the interpretation of the resulting index is made more difficult by this, necessitating a careful examination of the ratios in the individual components. In particular, one needs to distinguish between countries with low gender gaps in all three dimensions and countries with larger gaps going in opposite directions. These are treated the same in the gender gap measure, although arguably the former is to be preferred to the latter.

While much larger than the implied penalty for gender inequality inherent in the GDI, the gender gaps according to these gender gap measures are, on average, not very large either. This is partly due to the fact that gender gaps in the three components are indeed not very large, particularly in richer countries. But it is, once again, also due to the fact that the measured gender gaps in the longevity component are quite small, and thus they have a small impact on the overall gap measure.[26] But still the results yield some useful insights. Of particular note are the values above one in some transition countries, largely driven by the male disadvantage in life expectancy and the low gaps in the other components. Conversely, the lowest ratios correspond to some Middle Eastern and South Asian countries (with Yemen and Pakistan having the worst values), and also to many poor Sub-Saharan African countries, Here gender gaps in education and mortality (particularly in AIDS-affected countries) are

particularly large, to the detriment of women. In these countries, the gender gap measure is around 0.7, signifying substantial gender gaps in well-being measured along these three dimensions.

An alternative way to construct a disparity index that would particularly deal with the problem of ratios above one compensating for ratios below one is the suggestion Kakwani made in the online discussion.[27] He proposed to simply use the Atkinson inequality index (rather than the Atkinson welfare index, which is the inequality adjusted achievement measure currently being used). The way this is done is that the inequality-adjusted achievement in each component is divided by the weighted average of the achievement in that component and subtracted from one. Then gaps in opposite directions in components would not compensate each other, but add to each other. An application of this measure (using once again the assumption of halving the eared income gaps, not shown here) can be done but leads to very small values of the index, the maximum value being generated by Yemen with a value of 0.051 (with a value of zero signifying total gender equality and one signifying highest possible inequality). Given this and the difficulty of interpreting this measure, this would probably not be the best way forward, leaving a gender gap measure of the type already described as the best alternative.

Producing a GEM with income shares

As already discussed, a particular problem with the GEM is that it currently considers income levels rather than just income shares in its assessment, giving the problematic impression that only rich countries can really achieve high female empowerment. One easy way to fix this is to produce a GEM that indeed just considers income shares, and Table 3 presents the result of such a GEM (see GEM2 in the table, with GEM1 being the current one produced by the UNDP). This has a significant, and in general quite plausible, impact on the values and rankings of the GEM. The big ''winners'' are poorer countries with low gender gaps in the political system or the economy. For example, the GEM2 in Tanzania, Bulgaria, Romania, Chile, El Salvador, Bangladesh, and Thailand is much larger than GEM1, as these countries are no longer dragged down by the low income levels. At the top end, not much changes in terms of rankings.

Producing a GEM based on gender gaps

Finally, given that the application of the aversion to inequality procedure to shares is not based on a clear theoretical justification, it might be more straightforward to construct a GEM based on the gender gaps in the three components themselves. This index would be easier to interpret than the original GEM. In the last three columns of Table 3, I present such a measure in three ways. In the first (GEM3), we construct the GEM by taking the female–male ratio of the sex-specific achievement rates in each

Table 3. Various versions of the GEM for 2003

	GEM1 (UNDP)	GEM2 (earned income shares)	GEM3 (ratio rates)	GEM4 (ratio rates income index)	GEM5 (ratio shares)
Norway	0.9277	0.9464	0.6846	0.6844	0.6949
Denmark	0.8599	0.9290	0.6614	0.6611	0.6756
Sweden	0.8515	0.9580	0.7397	0.7393	0.7527
Iceland	0.8339	0.9052	0.6498	0.6495	0.6490
Finland	0.8328	0.9322	0.6709	0.6706	0.7012
Belgium	0.8278	0.9149	0.5807	0.5802	0.6032
Australia	0.8261	0.9102	0.6578	0.6576	0.6749
Netherlands	0.8143	0.8941	0.5581	0.5577	0.5668
Germany	0.8132	0.9045	0.5700	0.5696	0.5976
Canada	0.8074	0.8807	0.6011	0.6008	0.6121
Switzerland	0.7947	0.8733	0.5920	0.5919	0.6293
United States	0.7934	0.8112	0.5954	0.5951	0.6155
Austria	0.7791	0.8393	0.4831	0.4826	0.5066
New Zealand	0.7692	0.9083	0.6213	0.6210	0.6447
Spain	0.7448	0.8674	0.5011	0.5005	0.5197
Ireland	0.7241	0.7390	0.4264	0.4260	0.4313
Bahamas	0.7190	0.9007	0.6059	0.6053	0.6369
United Kingdom	0.7156	0.8155	0.4812	0.4808	0.5055
Costa Rica	0.6680	0.8696	0.4990	0.4975	0.4824
Argentina	0.6649	0.8459	0.5327	0.5316	0.5564
Portugal	0.6559	0.8188	0.4965	0.4959	0.5315
Singapore	0.6540	0.7719	0.4302	0.4297	0.4243
Trinidad & Tobago	0.6498	0.8586	0.5505	0.5493	0.5636
Israel	0.6217	0.7732	0.4952	0.4946	0.5066
Barbados	0.6150	0.8032	0.7825	0.7818	0.8374
Lithuania	0.6143	0.8383	0.7373	0.7366	0.8422
Poland	0.6117	0.8352	0.6165	0.6156	0.6538
Latvia	0.6055	0.8343	0.6277	0.6267	0.7441
Bulgaria	0.6041	0.8606	0.4844	0.4832	0.5142
Slovenia	0.6028	0.7654	0.5303	0.5297	0.5565
Namibia	0.6025	0.8533	0.5563	0.5543	0.5667
Croatia	0.5985	0.8174	0.4947	0.4937	0.5330
Slovakia	0.5971	0.8064	0.6123	0.6116	0.6489
Czech Republic	0.5953	0.7815	0.4977	0.4971	0.5248
Estonia	0.5952	0.8003	0.6754	0.6747	0.7924
Greece	0.5941	0.7363	0.4101	0.4094	0.4199
Italy	0.5886	0.6779	0.3606	0.3601	0.3825
Mexico	0.5831	0.7835	0.3865	0.3849	0.4034
Cyprus	0.5710	0.7252	0.3915	0.3908	0.4104
Panama	0.5629	0.8102	0.5146	0.5128	0.5052
Macedonia, TFYR	0.5550	0.8092	0.4998	0.4981	0.5012
Tanzania,	0.5378	0.8531	0.5619	0.5465	0.5690
Japan	0.5339	0.6182	0.3382	0.3377	0.3535
Hungary	0.5281	0.7252	0.5581	0.5574	0.6133
Dominican Republic	0.5274	0.7435	0.4244	0.4222	0.4153
Philippines	0.5265	0.8049	0.7675	0.7650	0.7569
Bolivia	0.5246	0.7886	0.4225	0.4172	0.4259
Peru	0.5114	0.7028	0.3619	0.3589	0.3578
Botswana	0.5046	0.7493	0.4930	0.4918	0.5130
Uruguay	0.5036	0.7397	0.4783	0.4768	0.5080

Table 3. Continued.

	GEM1 (UNDP)	GEM2 (earned income shares)	GEM3 (ratio rates)	GEM4 (ratio rates income index)	GEM5 (ratio shares)
Malaysia	0.5025	0.7253	0.3752	0.3738	0.3638
Colombia	0.5002	0.7474	0.4702	0.4684	0.4817
Moldova, Republic of	0.4943	0.7960	0.6632	0.6566	0.7244
Swaziland	0.4918	0.7214	0.4826	0.4796	0.5223
Ecuador	0.4901	0.7029	0.3368	0.3326	0.3345
Romania	0.4884	0.7401	0.5141	0.5126	0.5398
Belize	0.4864	0.6579	0.3885	0.3862	0.3802
Malta	0.4860	0.6350	0.3029	0.3021	0.3081
Korea, Republic of	0.4786	0.6406	0.3305	0.3298	0.3279
Russian Federation	0.4772	0.7167	0.5930	0.5920	0.6832
Chile	0.4749	0.6725	0.3937	0.3924	0.4022
El Salvador	0.4670	0.7127	0.3859	0.3831	0.3997
Thailand	0.4518	0.7052	0.4666	0.4652	0.4821
Venezuela	0.4414	0.6834	0.5061	0.5032	0.5004
Paraguay	0.4270	0.6452	0.3948	0.3915	0.3888
Ukraine	0.4174	0.6704	0.5290	0.5269	0.6211
Georgia	0.4159	0.6665	0.4818	0.4765	0.5365
Bahrain	0.3926	0.5464	0.2173	0.2164	0.1626
Mongolia	0.3882	0.6924	0.6356	0.6304	0.6337
Fiji	0.3807	0.6051	0.3545	0.3520	0.3430
Pakistan	0.3791	0.6149	0.2707	0.2634	0.2553
Sri Lanka	0.3699	0.6412	0.3860	0.3827	0.3729
Cambodia	0.3642	0.6731	0.3924	0.3889	0.4206
Honduras	0.3560	0.5987	0.2877	0.2821	0.2832
Iran	0.3161	0.5057	0.2192	0.2170	0.2128
Turkey	0.2846	0.5238	0.2541	0.2521	0.2499
Egypt	0.2742	0.4667	0.1954	0.1914	0.1940
Saudi Arabia	0.2529	0.3919	0.1724	0.1711	0.1465
Bangladesh	0.2183	0.5085	0.2626	0.2556	0.2509
Yemen	0.1233	0.3345	0.1415	0.1230	0.1374

Source: UNDP (2005).

of the components (i.e. the female to male rate of participation in parliaments, in skilled occupations, female to male earned income, etc.); in the second (GEM4), we use the ratio of the income index (rather than the income levels), which is nearly identical to the previous one; and in the third (GEM5), we just use the female–male ratio of the shares of total achievement to calculate a new GEM. The first of these three ways (i.e. GEM3) would be our preferred estimate as it is not sensitive to population shares.[28] The rankings are now dramatically different from the current GEM as well as the one based on earned income shares (Compare GEM3 to GEM1 and GEM2 in Table 2). The main reason is that, in contrast to the current GEM in some components, the female–male ratio is far above one, thus favouring females and making up for large gaps hurting females in other components. For example, in Barbados, the ratio of female to male managers stands at nearly three, compensating for existing gaps in the

other components and ensuring that Barbados has the highest value of the GEM overall. In the current GEM produced by the UNDP, such a predominance of females in one component would attract a penalty and thus reduce the GEM, while here it is seen as a benefit, able to compensate for gaps elsewhere. As discussed earlier, some possibility of compensation of gaps in opposite directions seems desirable, but full compensation might not be. But clearly these measures are able to address some of the short-comings of the existing GEM and provide very different results that are well worth considering more closely.

Conclusion: further items on the agenda

In this paper I have attempted to critically reviewed the two existing gender-related indicators and make constructive suggestions to deal with some of the short-comings identified. I have shown that, while either calculating separate male and female HDIs or constructing a Gender Gap Measure might be preferable to reporting the GDI, each approach carries its own disadvantages. I have also presented a few suggestions to improve upon the GEM, which would lead to very different assessments of gender-based empowerment than the current measure.

I want to end by emphasizing that a number of short-comings inherent in the current indicators of gender-related development were left unaddressed and would require further consideration. Among them are the following

GDI and Gender Gap Index

(a) Revisiting the choice of components for the gender gap index. Since it would be a new measure not directly linked to the HDI, other components could be included. Prominent issues to consider are measures of physical security (i.e. absence of violence), time use (or, more narrowly, leisure time; see Folbre's contribution in this *JHD* special issue) and/or direct assessments of gender gaps in certain attributable consumption (if possible).
(b) Revisiting the assumption of whether the assumed five-year advantage in longevity for females is empirically valid and ethically justified.
(c) Considering whether a higher inequality aversion parameter (and/or a smaller age range when constructing the life expectancy index) should be used to increase the relative weight of the life expectancy component in the GDI, the male and female HDIs, or the Gender Gap Index.
(d) Stating clearly that the GDI, the HDI, and all distribution-sensitive measures will always only consider those currently alive, and thus have the unfortunate consequence of ensuring that sex-selective abortions raises the GDI by reducing the life expectancy gap of the survivors and by reducing the female population share, and thus the human development importance of gender gaps in all dimensions. It

would be useful to undertake further work on how to tackle this rather general issue.

(e) Identifying plausible assumptions to translate gaps in earned income shares into gaps in human development-related consumption. The approaches used here are purely illustrative and have no sound empirical foundation.

(f) Replacing the use of the non-agricultural wage ratio by estimating economy-wide wage ratios for the construction of the earned income component. Here the initiative by the Economic Commission of Africa on the African Gender Status Index points to promising new avenues to gather data (Economic Commission for Africa, 2005).

(g) Improving the coverage for the earned income component.

Gender Empowerment Measure

(a) Revisiting the choice of components with an attempt to include measures that affect most women and men (and not just the political and economic elite; see Cueva's contribution in this *JHD* special issue).

(b) Improving the coverage for the GEM, which currently constitutes a serious short-coming.

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Notes

1 There had been previous (and eventually discontinued) attempts UNDP to incorporate distributional issues into the HDI (see Anand and Sen, 2000).

2 There has been a proliferation of such measures in the academic and policy literature recently, including a Gender Equity Index by Social Watch (2005), a Gender Gap Index by the World Economic Forum (2005), the African Gender Status Index by the Economic Commission for Africa (2004), the Relative Status of Women Index by Dijkstra and Hanmer (2000), and the Standardized Index of Gender Equality by Dijkstra (2002). See Klasen (2006) for a discussion of these measures.

3 See, for example, Bardhan and Klasen (1999), and Dijkstra and Hanmer (2000) for individual contributions, and Schüler's contribution to this *JHD* special issue for a review.

4 I also want to emphasize that much of the added value provided by the UNDP through these measures is not necessarily the composite index itself but the gathering and presentation of the data on the various dimensions of human development, which allow for a much more careful assessment of human development in a comparative perspective than the HDI by itself (or GDP per capita or income poverty rates, for that matter) could provide.
5 See Grün and Klasen (2003) for a discussion of that literature.
6 For more details, see Bardhan and Klasen (1999), and UNDP (1995, 2005).
7 See Klasen (2006) for distinguishing between different types of gender-related well-being measures, including gender-sensitive measures (such as the GDI and the GEM), gender-disaggregated measures (e.g. male and female HDIs suggested later), as well as gender gap measures (see later).
8 In the Atkinson approach, the welfare ''penalty'' of inequality (based on existing aversion to inequality) is the measure of inequality itself. Here we describe it as the welfare penalty of inequality as this is really what it is. For details refer to Atkinson (1970).
9 There is also some debate about the exact magnitude of this survival disadvantage, which is likely to be smaller in countries with high overall mortality. See Bardhan and Klasen (1999) for a discussion.
10 For example, the *World Bank's World Development Report 2006 Equity and Development* takes the position that inequity exists whenever opportunities are curtailed based on ascriptive characteristics of people (such as sex, race, etc.) Using this approach, the biological survival disadvantage of males should be seen as an inequality of opportunities (World Bank, 2005). See also the Dijkstra contribution to this *JHD* special issue for an opposing view.
11 For example, the countries approaching parity in life expectancy are in parts of Sub-Saharan Africa where females die at higher rates and at younger ages from AIDS, hardly a desirable state of affairs from a policy perspective.
12 If we killed the poor and uneducated, the GDP per capita would rise, as would the education and income components of the HDI.
13 Technically, what counts for the GDI is not the absolute gender gap in earnings, but the gender gap in the earned income indices for males and females, which are based on the log of earnings (under the assumption that only some consumption is human development related, and this portion falls with rising incomes; see Anand and Sen, 2000). In the case of Saudi Arabia, the female earned income index amounts to about 50% of the male index. The gap is so much lower as male and female incomes implying that a much higher share of the much lower female earnings is used for human development related consumption, while a lower share of the higher male earnings is used. This generates the fiction that each individual in the household spends their income on their own consumption priorities only, which does not square with the way household decisions are made. Also, even a gap of 50% in nutrition, housing, or clothing spending seems very large.
14 This problem was recognized by Anand and Sen (1995) in their technical background note and they said that the gender gaps in earned incomes reflect gender gaps in agency. While this is likely to be the case, it still seems problematic to adjust a proxy of consumption of human development-related goods by gender gaps in agency to arrive at gender gaps in consumption.
15 These indices of achievement are calculated by taking the difference between the actual achievement (e.g. male life expectancy) and the defined minimum achievement (e.g. 22.5 years in the case of male life expectancy) and dividing it by the difference between the maximum and the minimum achievement. For details, see Bardhan and Klasen (1999) and UNDP (2005).
16 It is not clear how one could allow for compensation of gender gaps in different directions within the current method of calculation in the GDI. Also, one should point that it not obvious that one should allow for full compensation of gender gaps in different directions. Full compensation would particularly lead to the undesirable

conclusion that a country with dramatic but equally large gender gaps in opposite directions is as well off as a country with gender equality in all dimensions (see later).

17 The essence of the change was that the inequality aversion calculation is now applied after the log transformation of incomes (rather than applied to unadjusted incomes) to indicate that the declining human development benefit of incomes is not only true for average incomes (as in the HDI), but also for incomes earned by males and females. Dijkstra (2002) and in her contribution to the special issue criticizes the change as it effectively dampens the gender gap in earned incomes and thus reduces the overall penalty for gender inequality. However, I argue that, even if one may see the resulting numbers as misleading (as discussed in Bardhan and Klasen, 1999, 2000), this change was consistent: if the GDI is designed to be an inequality-adjusted HDI, one has to treat incomes in both measures the same, and only the procedure used since 1999 ensures this and also avoids some other inconsistencies of the previous method (see Bardhan and Klasen, 1999).

18 According to the HDRO, the reason for not reporting trends in the GDI is that there often is no new information on the underlying data, so that such trends would not be meaningful. While this is a serious consideration, I would favour that the series is regularly updated and made available, and those data for which no new information is available should be highlighted. This way, all changes to historical data would be incorporated and researchers and policy analysts could deal with the issue of missing data updates themselves.

19 We do not use the reported HDI but calculate an HDI based on the weighted average of the gender-disaggregated data. It is very close to, but not identical to, the reported HDI due to rounding errors.

20 There is indeed evidence that gender gaps are smaller in rich countries (for example, World Bank, 2001), but substantial gaps remain.

21 For a discussion of how to change the relative importance of gender gaps, see Bardhan and Klasen (1999) and Diskstra (2002). The latter's proposal is to standardize the index in each component by the standard deviation. While this would ensure that in each year each component would have an equal influence on the final measure, such a standardization leads to problems of comparisons over time (and dependence on the number of countries included) as an improvement in education would have a different impact on the GDI depending on the standard deviation of the education index in a particular year, which is a rather undesirable property.

22 Overall labour force participation is, however, indirectly captured in the earned income component.

23 See also Dijkstra (2002), who makes some similar points.

24 This is a point brought to my attention by Richard Leete in the online discussion, who also suggested to simply use income shares rather than income levels for the GEM. Dijkstra (2002) made the same suggestion.

25 An example might illustrate the point. Take the example of Brazil shown in the annex to the Introduction of this *JHD* special issue. Based on earned incomes of males of $10,963 and females of $4704, the male index is shown to be 0.784 and the female index 0.643. The proposal would be simply to halve the difference (i.e. to make the male index 0.749 and the female index 0.678), based on the notion that this would more adequately reflect gender gaps in consumption.

26 One way to increase them would be to reduce the range of life expectancy values when constructing the indices of achievement (e.g. from current values of 22.5 to 82.5 for males and 27.5 and 87.5 for females to, say, 32.5 to 82.5 for males and 37.5 to 87.5 for females).

27 See http://hdr.undp.org/docs/nhdr/consolidated_replies/Revisiting_GDI_GEM_31October2005.pdf

28 An example might illustrate the differences between the first and the third methods. Suppose a country has 600 females and 400 males, and 1% of all females (i.e. six females) sit in parliament, compared with 3% of all males (i.e. 12 males). Using the first method, the gender gap would be 0.33 (1% divided by 3%). Note that the total number

of parliamentarians is 18, so the female share is 1/3 and the male share 2/3. Thus using the third method, the gender gap would be 0.5 (i.e. 1/3 divided by 2/3). As can be seen, this last method leads to a smaller gender gap as there are simply more females in the country. It seems more appropriate for an indicator of gender equality to consider whether males and females have equal chances to become parliamentarians, for which the first method would be best.

References

Anand, S. and Sen, A. (1995) 'Gender inequality in human development: theories and measurement', *Human Development Report Office Occasional Paper No. 19*, UNDP, New York.

Anand, S. and Sen, A. (2000) 'The income component of the Human Development Index', *Journal of Human Development*, 1(1), pp. 83–106.

Atkinson, A.B. (1970) 'On the measurement of inequality', *Journal of Economic Theory*, 2, pp. 244–263.

Bardhan, K. and Klasen, S. (1999) 'UNDP's gender-related indices: a critical review', *World Development*, 27, pp. 98–1010.

Bardhan, K. and Klasen, S. (2000) 'On UNDP's revisions to the gender-related development index', *Journal of Human Development*, 1, pp. 191–195.

Dijkstra, A.G. (2002) 'Revisiting UNDP's GDI and GEM: towards an alternative', *Social Indicator Research*, 57, pp. 301–338.

Dijkstra, A.G. and Hanmer, L.C. (2000) 'Measuring socio-economic gender inequality: towards an alternative to the UNDP Gender-related Development Index', *Feminist Economics*, 6(2), pp. 41–75.

Economic Commission for Africa (2004) *The African Gender and Development Index*, ECA, Addis Ababa.

Grün, C. and Klasen, S. (2003) 'Growth, inequality, and well-being: comparisons across space and time', *CESifo Economic Studies*, 49, pp. 617–659.

Haddad, L., Hoddinott, J. and Alderman, H. (Eds) (1997) *Intrahousehold Resource Allocation in Developing Countries*, Johns Hopkins University Press, Baltimore, MD.

Haq, M. (1995) *Reflections on Human Development*, Oxford University Press, New York.

Kanbur, R. and Mukherjee, D. (2003) 'Premature mortality and poverty measurement', *mimeo*, Cornell University, New York.

Klasen, S. (1998) Marriage, Bargaining, and Intrahousehold Resource Allocation: Excess Female Mortality among Adults in Rural Germany (1740–1860), *Journal of Economic History*, 58, pp. 423–467.

Klasen, S. (2006) 'Gender-related indicators of well-being', in M. McGillivray (Ed.), *Measuring Human Well-Being*, Palgrave-Macmillan, London.

Klasen, S. and Wink, C. (2003) 'Missing women: revisiting the debate', *Feminist Economics*, 9, pp. 263–299.

Ravallion, M. (1997) 'Good and bad growth: The Human Development Reports', *World Development*, 25(5), pp. 631–638.

Sen, A. (1990) 'Gender and cooperative conflicts', in I. Tinker (Ed.), *Persistent Inequalities*, Oxford University Press, New York.

Sen, A. (1998) *Development as Freedom*, Knopf, New York.

Social Watch (2005) *Roars and Whispers Gender and Poverty: Promises versus Action*, Social Watch, Montevideo.

Thomas, D. (1997) 'Incomes, expenditures and health outcomes: evidence on intrahousehold resource allocation', in L. Haddad, J. Hoddinott and H. Alderman (Eds), *Intrabousehold Resource Allocation in Developing Countries*, Johns Hopkins University Press, Baltimore, MD.

United Nations Development Programme (1995) *Human Development Report*, Oxford University Press, New York.

United Nations Development Programme (2000) *Human Development Report*, Oxford University Press, New York.

United Nations Development Programme (2005) *Human Development Report*, Oxford University Press, New York.
Waldron, I. (1983) 'The role of genetic and biological factors in sex differences in mortality', in A. Lopezand and L. Ruzsicka (Eds), *Sex Differentials in Mortality*, Australian University Press, Canberra.
World Bank (2001) *Engendering Development*, World Bank, Washington, DC.
World Bank (2005) *World Development Report: Development and Equity*, Oxford University Press, New York.
World Economic Forum (2005) *Women's Empowerment: Measuring the Global Gender Gap*, WEF, Davos.