

On UNDP's Revisions to the Gender-Related Development Index

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In a recent article (Bardhan and Klasen, 1999) we had reviewed UNDP's gender-related indices included in the annual Human Development Reports since 1995. In particular, we had suggested certain modifications to the Gender-Related Development Index (GDI), including a revision of the earned income component of the GDI. Partly based on our comments, UNDP modified the procedure for calculating the GDI in the 1999 Human Development Report (UNDP, 1999). Since the 1999 Report presents the new procedure in the technical annex without mentioning that it is different from previous years' procedure, we want to briefly describe the changes made and their effects on the GDI ranking of countries.

The GDI adjusts the Human Development Index (HDI) downward, based on the notion that gender inequality reduces the overall level of well-being in a country.¹ Each of the three components -- life expectancy, education, and earnings -- are adjusted to take gender disparity into account. While supporting the idea of a gender inequality-adjusted index of human development, we had pointed out a number of conceptual and practical problems in its estimation (Bardhan and Klasen, 1999). First, the extent of downward adjustment of the HDI (the so-called 'penalty for gender inequality')², was almost entirely determined by gender gaps in the earned-income component, largely neglecting gender gaps in education and life expectancy. Second, the estimation of the earned-income component suffered from a number of theoretical and practical problems severely limiting the usefulness of the index for international comparisons. Third, a peculiarity in calculating the earned income component of the GDI penalized, in effect, rich countries much more than poor countries for the same gender-gap in earnings. In particular, UNDP's formula for calculating the GDI first applied the penalty for gender inequality on income shares earned by males and females and then multiplied the result with the 'adjusted' income,³ the concave transform of actual per capita incomes. A country with a high income (and thus a high 'adjusted' income) would thus have its penalty for gender inequality magnified by the level of its adjusted income. The result was

¹ We will not review the GDI in detail here. Readers are referred to Bardhan and Klasen (1999) which will provide a good background for the discussion here.

² This is simply the HDI minus the GDI. See Table 1 for illustration.

³ As pointed out by Anand and Sen (1996), the concave transformation of PPP-adjusted income cannot properly be called 'adjusted' or 'discounted' income but simply is a concave transformation that transforms income into a pure number. I refer to it as 'adjusted' income in line with the usage of the Human Development Reports.

unusually high penalties for gender inequality (and consequently low GDI ranks) imposed on countries of the Middle East, where high gender-gaps in income coexist with comparatively high income levels (see left panel of Table 1).⁴

We had proposed that the procedure for calculating the earned income component be amended to *first* calculate ‘adjusted’ incomes for males and females (based on the concave transformation of actual earned incomes of men and women) and *then* apply the penalty for gender inequality (see Table 5 in Bardhan and Klasen, 1999). This way the GDI would treat income consistently with the HDI.

In the latest (1999) Report, UNDP addressed this third problem and amended the procedure for calculating the income component in exactly the way we had suggested.⁵ Now earned incomes are first estimated for males and females, then adjusted by using the concave transformation, and then the penalty for gender inequality is applied. Since the penalty for gender inequality is now applied to ‘adjusted’ incomes, this penalty is now much smaller in rich countries for two reasons. First, the erroneous magnification of the gender penalty in rich countries inherent in the previous procedure is taken out, thus reducing penalties in these countries. Second, since differences in ‘adjusted’ incomes earned by males and females are much smaller than differences in actual incomes, particularly in rich countries, the resulting penalty meted out for these differences is also smaller.

In addition, the concave transformation of actual income into ‘adjusted’ income was changed for the HDI and, by implication, for the GDI. Instead of a discontinuous transformation, actual incomes are now transformed into adjusted incomes using a logarithmic function.⁶ While the earlier transformation of actual into ‘adjusted’ incomes gave virtually no weight to incomes above the world average, now the additional value of a dollar declines steadily and smoothly but always remains positive and significant. This also means that gender-gaps in incomes in rich countries would now translate into larger gender gaps in ‘adjusted’ incomes and therefore attract a larger penalty than previously.

Thus, the change in the GDI calculation procedure reduces the implied penalty for gender inequality in rich countries, while the change in the income adjustment procedure increases it. What is the net result?

⁴ For example, Bahrain and Pakistan had about the same gender gaps in earned incomes. Yet Bahrain received a 50% larger overall penalty for gender inequality than Pakistan despite the fact that Bahrain had much lower gaps in education and life expectancy.

⁵ As it does not mention anywhere that the procedure for calculating the GDI was changed, it also does not state the factors that lead to this change.

⁶ For a critique of the old adjustment procedures and the new ones and various alternative proposals, see Anand and Sen (1996, 1999).

Table 1 below shows HDIs, GDIs, and the implied penalties for gender inequality based on the 1998 and the 1999 Reports.⁷ In the left-hand panel, one can see the large penalties for gender inequality imposed on the countries of the Middle East (and some others, including Ireland and Mexico). As a result, these countries also have a much lower GDI than HDI rank. Conversely, countries in Eastern Europe (and Thailand) have a very small penalty and their GDI rank is much higher than their HDI rank. The right-hand panel shows the penalties and rank differences after the two changes have been implemented. Now, for most rich countries, the penalty for gender inequality drops drastically. It is close to zero in most OECD countries. Also in the countries of the Middle East, the penalty is sharply reduced. In low-income countries, however, we see relatively little change in the penalty for gender inequality. Clearly, the correction of the formula for calculating the GDI has had a major influence on the penalty for gender inequality.⁸ The rank differences have also changed considerably. While in the 1995-98 reports, there were substantial differences in the GDI and HDI rank (up to 40 places), the 1999 report shows comparatively minor changes. In fact, in 103 of the 143 countries listed, the GDI rank differs from the HDI rank by less than 2 positions, and nowhere the rank change by more than 9 positions. The previous large improvements in rank of Eastern European countries (and Thailand) have largely disappeared, as have the large deteriorations in rank of the Middle Eastern countries. Thus, the 1999 Report figures give a drastically altered impression of the impact of gender inequality on human development. These major changes in the values and rankings between the two years are almost exclusively driven by the changes in methodology, not by changes in gender inequality in these countries.

While we welcome the changes made by the UNDP's 1999 Report, as they correct an inconsistent treatment of incomes between the GDI and the HDI and improve the transformation function for incomes, we would like to raise a few caveats.

First, how are we to interpret the fact that now the revised GDI suggests that in most rich countries gender inequality is too small to have a noticeable impact on their human development? All this tells us is that gender bias in the very crude indicators used in the HDI—life expectancy, literacy, gross enrolments, and 'adjusted' income—are indeed very small in most rich countries. At the same time, this does not mean that more subtle gender inequalities do not exist in rich countries (e.g. in gender bias in educational choices, quality of education, access to employment, training, or promotion, pay, leisure time, certain consumption goods) which may have a substantial impact on human development. It is just that the HDI and GDI are too crude to pick up these more subtle inequalities.⁹

⁷ One should point out that the data base used in the 1999 Report has also changed somewhat so that some of the changes could be due to that factor. Most of them are due to the two changes described above.

⁸ It also is clear that the change in the formula has had a much larger impact on reducing the penalty in rich countries than the change in the transformation of incomes had on increasing it.

⁹ This should not be seen as a criticism of these indices per se. As these indices compare all countries of the world in just three dimensions for which data are available, they have to be crude. Moreover, the statistical

Second, the GDI remains a problematic indicator of gender-sensitive human development. In particular, the implied penalty for gender inequality remains dominated by the earned income component. For example, as a result of its higher gender gap in earned income Saudi Arabia continues to attract a much larger penalty for gender inequality than Nepal although it has much lower gender gaps in education and life expectancy. Thus gender gaps in life expectancy and education continue to play too small a role in the GDI. There are several ways one could remedy this problem, as discussed in Bardhan and Klasen (1999).

Third, there continue to be conceptual and practical problems with the earned income component the GDI. Its interpretation is unclear and the database used to generate it is very thin, not very reliable, and plagued by inconsistencies across countries (Bardhan and Klasen, 1999).

While supporting this year's changes, we look forward to further refinements and improvements in the GDI estimation procedure in the years to come that will address some of the remaining shortfalls of this important indicator.

References

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Table 1: The Changing Penalty for Gender Inequality

	1998 Report (data refer to 1996)				1999 Report (data refer to 1997)			
	GDI	HDI	Penalty	GDI-HDI Rank	GDI	HDI	Penalty	GDI-HDI Rank
Sweden	0,932	0,936	0,004	7	0,919	0,923	0,004	1
USA	0,927	0,943	0,016	-2	0,926	0,927	0,001	0
Japan	0,902	0,940	0,038	-5	0,917	0,924	0,007	-4
Ireland	0,859	0,930	0,071	-10	0,892	0,900	0,008	0
Bahrain	0,746	0,872	0,126	-19	0,813	0,832	0,019	-2
Mexico	0,774	0,855	0,081	-2	0,778	0,786	0,008	0
Poland	0,834	0,851	0,017	13	0,800	0,802	0,002	2
Thailand	0,812	0,838	0,026	12	0,751	0,753	0,002	2
Brazil	0,751	0,809	0,058	-1	0,733	0,739	0,006	3
Saudi Arabia	0,589	0,778	0,189	-39	0,703	0,740	0,037	-9
Russia	0,757	0,769	0,012	12	0,745	0,747	0,002	2
Algeria	0,627	0,746	0,119	-21	0,642	0,665	0,023	-1
Indonesia	0,651	0,679	0,028	0	0,675	0,681	0,006	0
Egypt	0,555	0,612	0,057	-7	0,603	0,616	0,013	-2
Kenya	0,459	0,463	0,004	5	0,517	0,519	0,002	0
Pakistan	0,399	0,453	0,054	-3	0,472	0,508	0,036	-2
India	0,424	0,451	0,027	1	0,525	0,545	0,020	-3
Nigeria	0,375	0,391	0,016	-1	0,442	0,456	0,014	1
Bangladesh	0,342	0,371	0,029	-3	0,428	0,440	0,012	1
Tanzania	0,354	0,358	0,004	3	0,418	0,421	0,003	4
Nepal	0,327	0,351	0,024	-6	0,441	0,463	0,022	-2
Mozambique	0,264	0,281	0,017	-1	0,326	0,341	0,015	1

Note: The Penalty for Gender Inequality is simply the HDI value minus the GDI value.