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# REVISITING UNDP'S GDI AND GEM: TOWARDS AN ALTERNATIVE

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## INTRODUCTION

This aim of this paper is twofold. First, it provides a critical review of the two gender equality measures that have been developed by UNDP in its 1995 *Human Development Report* (UNDP, 1995). Until now, most academic attention has been directed to the Gender-related Development Index (GDI) and much less to the Gender Empowerment Measure (GEM). In identifying strengths and weaknesses of both indices, and especially on the GEM, the paper brings new insights to the fore. The second aim of the paper is to develop a new alternative measure of gender equality. This new measure, the Standardized Index of Gender Equality (SIGE) draws on the good aspects of GDI and GEM while at the same time attempting to avoid their methodological limitations.

The measurement of gender inequality in societies has become an important topic in the academic literature. One reason is that gender equality is an important issue in itself. National and regional governments, as well as citizens and NGOs are concerned about eliminating gender discrimination and improving the relative situation of women. They want benchmarks and indicators to compare the achievements in furthering an equal position of women with that in other countries, and to assess the progress made over time.

The second reason why measuring gender equality has become important is that there is renewed attention for the relationship between gender equality and economic growth. The question is whether more gender equality promotes or hampers growth. Grown et al. (2000) observe that win-win situations are possible, as well as win-lose scenarios. Some recent studies find a positive rela-

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tionship between gender equality and economic growth: the higher the gender equality, the higher the growth rate (Dollar and Gatti, 1999; Klasen, 1999). In these studies, gender equality is defined as equality in education. Seguino (2000) finds that high growth is accompanied by low gender equality. She uses relative female to male wages to measure gender equality and focuses on East Asian economies between 1975 and 1995. High female-male wage differentials and high growth were also accompanied by high exports.

It seems that results are not only contingent upon different scenarios, but also depend on what variable is used to measure gender inequality. In order to reach more definite conclusions on the relationship between gender equality and economic growth, an indicator is needed that combines several dimensions of equality.

UNDP's pioneering work in developing GDI and GEM has been important in raising attention for gender inequality in international policy debates, as well as in raising attention among academics for the issue of measuring gender inequality. The GDI is meant to be a measure of relative well being. In analogy with the Human Development Index (HDI) it uses the variables adjusted income,[1] education and health. The GEM is meant to be a measure of relative female economic and political power. It includes the share of women in parliament, the share of women in technical and professional, and management and administrative positions, and (unadjusted) income. Both measures have since been computed annually.

One of the weaknesses of both GDI and GEM is that they do not measure gender equality *as such*, but instead some combination of absolute levels of achievement and a punishment for inequality (see, for example, Dijkstra and Hanmer, 2000; Bardhan and Klasen, 1999). This implies that they cannot be used for assessing the relationship between gender equality and economic performance. Other criticisms are directed to the choice of variables and indicators, and to the construction of the overall index.

So far, UNDP has hardly changed the basic principles and the methodology for computing GDI and GEM. There is one exception. In response to one of the issues raised by Bardhan and Klasen (1999), UNDP has changed the computation of the GDI as of the

1999 Human Development Report (UNDP, 1999; UNDP, 2000). However, I will argue below that there are conceptual problems with the Bardhan and Klasen (1999) reasoning on which the change is based.

Inspired by the GDI and GEM, several alternative composite indices for gender equality have been suggested (Bardhan and Klasen, 1999; Dijkstra and Hanmer, 2000; Forsythe et al., 1998; White, 1997). Before developing my own alternative measure of gender equality, I will briefly review these earlier alternatives. The new measure, the Standardized Index of Gender Equality (SIGE), intends to include the most important dimensions of gender equality. Its main advantages include that it is a measure of gender equality as such, that it integrates the dimensions used in GDI and GEM, and that it avoids most of their methodological problems.

## *GDI and GEM*

A first line of criticism against GDI and GEM is about the choice of dimensions of gender equality and of the indicators (variables) to measure these dimensions. A second problem is the way GDI and GEM deal with the relative female and male achievements on these variables. In fact, both indices do not measure gender inequality *as such,* but some combination of absolute levels of attainment and relative female attainments. In addition, inequality is accounted for in different ways for the three variables that compose each of the two indices. As to the GDI, these limitations have been recognised before (Bardhan and Klasen, 1999; Dijkstra and Hanmer, 2000; White, 1997). As White correctly states, UNDP (1995) is wrong in drawing comparative conclusions on gender equality on the basis of the countries' GDI scores (White, 1997). Thirdly, there are problems with the construction of composite indices. Bardhan and Klasen (1999) have also brought these forward, in particular for the GDI. Again, the GEM received much less attention in this respect. In the following, I analyze first the choice of variables, then the way these variables are transformed and indexed in order to take account of gender inequality, and finally I discuss the way the composite indices are constructed.

The GDI uses the same indicators as the earlier introduced Human Development Index (HDI, see, UNDP, 1990), namely income, life expectancy and education (Table I). With respect to the choice of variables for the GDI, most criticism has been raised against the income variable (see, Bardhan and Klasen, 1999; Dijkstra and Hanmer, 2000). This indicator is based on an estimate of the female share in earned income ($s_f$). This is computed from the female share in the economically active population ($ea_f$) and the relative female/male urban wage rate ($w_f/w_m$), as follows:

$$(1) \qquad s_f = \frac{(w_f/w_m) \times ea_f}{[(w_f/w_m) \times ea_f] + ea_m}$$

Definitions of economically active population vary, however. In particular, work in family enterprises and in subsistence activities is sometimes included and sometimes it is not, and this makes a large difference for the outcome. Secondly, the fact that the urban wage differential is taken means that rural wages and most informal sector wages are excluded. In addition, urban wage rates by sex were only available for 55 countries. A weighted average of the relative female/male wage ratio found in these 55 countries (which proved to be 75%) has been used for the other 130 countries. This implies that for most countries, the 75% wage differential is simply assumed. A final point of critique against this indicator is that the actual distribution of income within households is not taken into account, which may reinforce income differences (Dwyer and Bruce, 1988). However, it is still very difficult to include this distribution given the lack of systematic data on this issue.

Much less criticism has been raised against the other two indicators in the GDI, life expectancy and education. As in the HDI, education is a combination of literacy rates (2/3) and combined primary and secondary enrolment rates (1/3).[2] However, a problem with the data on life expectancy is that they do not include the "missing women." Comparing the sex ratios for different countries, it turns out that in some countries, especially in China, Bangladesh, India and Pakistan, the actual ratio between women and men is much lower than the expected ratio (Bardhan and Klasen, 1999, p. 990). In these countries, girl babies are often much less desired than boys, leading to sex-specific abortions or the neglect of female babies

TABLE I

The computation of GDI and GEM in the 2000 Human Development Report

| Measure | Indicators | Step 1 (indexation for GDI and income variable in GEM; penalty for inequality in other GEM indicators) | Step 2 (penalty for inequality for GDI and income variable in GEM, indexation for other GEM indicators) | Overall index |
|---|---|---|---|---|
| GDI | Life expectancy | Women live five years longer, index 0–100 for male and female achievement | Harmonic mean of population-weighted male and female achievements | Simple (arithmetic) average of three scores |
| | Education: adult literacy, combined enrolment | index 0–100 for adult literacy<br>index 0–100 for enrolment<br>1/3 enrolment plus 2/3 literacy; gives index of male and female achievement | Harmonic mean of population-weighted male and female achievements | |
| | Share in earned income, %, adjusted | Based on female/male urban wage and female share in economically active population; index of male and female adjusted income per capita | Harmonic mean of population-weighted average male and female per capita adjusted incomes | |
| GEM | Share in parliament, % | Harmonic mean of population-weighted shares | Indexed 0–100 by multiplying by 2 | Simple (arithmetic) average of three scores |
| | Share in professional and technical, in %; administrative and management positions, % | Harmonic mean of population-weighted shares;<br>Harmonic mean of population-weighted shares | Indexed 0–100 by multiplying by 2;<br>Indexed 0–100 by multiplying by 2; simple average of the two | |
| | Share in earned income, % | Based on female/male urban wage and shares in economically active population; index of male and female unadjusted income per capita | Harmonic mean of population-weighted average male and female per capita incomes | |

Source: UNDP (2000), pp. 270/272.

(Miller, 1988; Sen and Sengupta, 1983). Although the latter should be reflected in life expectancy ratios, there will often be deficient reporting of infant mortality. Life expectancy rates will in general not account for these sex-specific "health risks."

The variables that compose the GEM include 1) the female share in parliament, 2) the female share in professional and technical, and administrative and management positions, and 3) (again) the female share in income (Table I). Critics have pointed to the limited relevance of the female share in parliamentary seats (Bardhan and Klasen, 1999; Wieringa, 1997b). In former socialist countries this share tended to be high, but parliaments did not have much power. It has been recommended to look at female representation in local governance bodies, and to other indicators of female power such as the strength of women's organisations and the way women's interests are promoted. However, data on female representation at lower levels are not systematically available, and there are conceptual and measurement problems involved in using other indicators. With respect to the second variable, the female share in professional and technical, and administrative and managerial positions not many objections have been raised thus far. While the female share in parliament may fluctuate according to the particular year in which it was measured, the female share in these occupations is less sensitive for the year of measurement. The third indicator in the GEM is the female share in earned income. This is computed the same way as for the GDI (see (1)), so the same criticisms hold.

*Accounting for Gender Inequality*

For the GDI the three variables are the female *share* in earned income, and the male and female *achievements* with respect to life expectancy and education. For the GEM there are three *shares*: in income, parliament and in high labour market positions. I now analyze how these outcomes are elaborated and indexed for inclusion in the composite index, and how inequality is accounted for in that process.

In the GDI, the general principle is that it begins with the overall achievement (the average scores for men and women) and then subtracts for gender inequality (see also Anand and Sen, 1995). The male and female achievements for education and life expectancy

are first indexed on a scale from zero to 100. Since adult literacy and combined primary and secondary gross enrolment are already figures between 0 and 100 per cent, no special calculation is needed. The index for "education" is a weighted average of the achievements on literacy (weigt of 2/3) and of combined primary and secondary enrolment (weight of 1/3).

For life expectancy, the index is based on given minimum and maximum values. These are different for men and women, taking into account that women, on average, live five years longer than men. For women the maximum and minimum values are 87.5 and 27.5 years, respectively, while they are 82.5 and 22.5 for men. The life expectancy index for females ($lind_f$) is computed from the actual value for female life expectancy ($l_f$) as follows:

$$(2) \qquad lind_f = \frac{l_f - 27.5}{87.5 - 27.5} = \frac{l_f - 27.5}{60}$$

and the life expectancy index ($lind_m$) for males is:

$$(3) \qquad lind_m = \frac{l_m - 22.5}{82.5 - 22.5} = \frac{l_m - 22.5}{60}$$

In order to account for gender inequality, it is assumed that countries have a certain degree of "inequality aversion": at the same average level of, for example, the education indicator, a country with equal scores for men and women will have a higher number than a country in which male and female achievements differ. This inequality aversion factor $\varepsilon$ (epsilon) is set at 2, which implies that the harmonic mean is taken from the female and male achievements. The harmonic mean is weighted with female and male shares in population ($p_f$ and $p_m$), to get an "equally distributed index." The equally distributed life expectancy index, for example, is computed as follows:

$$(4) \qquad \frac{1}{\left[(lind_f)^{-1} \times p_f + (lind_m)^{-1} \times p_m\right]}$$

For income the computation is a bit different. Until 1999, the female (male) share in total income was divided by the female (male) share in population to get "proportional income shares." The harmonic mean of these proportional income shares was then

computed. Strangely enough, in computing this harmonic mean the income shares were again weighted with shares in population, as in (4). This is redundant, since shares in earned income have already been divided by population share to get the "proportional income shares." One possibility to do away with this redundancy is to compute harmonic means as in (4) directly from the female and male shares in income. These shares should then first be indexed on a scale from 0 to 100 by multiplying them with 2, as is also done with the other two indicators in the GEM (see below).

Until 1999, the last step for the income variable was to multiply the harmonic mean by the "adjusted" average income per capita and then to index the resulting figure on a scale from 0 to 100. As in the HDI, "adjusted" income means that per capita income levels at higher levels are discounted. The reason for this is that in both HDI and GDI the focus is on well-being, and that above a certain income level the marginal increase in well-being as a result of that extra income becomes progressively smaller.

As of the 1999 report, this procedure has changed in response to the critique from Bardhan and Klasen (1999, p. 993). They argued that multiplying the harmonic mean of proportional income shares by *average* income means that similar gender disparities in income shares have larger consequences at higher income levels than at lower income levels. Furthermore, they argue that the procedure assumes that ". . . every dollar difference in earned incomes is worth the same, regardless of the average income levels, and that the total penalty for a given gender gap should be proportional to the average adjusted income levels of the country . . ." (Bardhan and Klasen, 1999, p. 993). They suggest that average female and male incomes be discounted *before* the penalty for the gap in earned income is computed, since this would be consistent with the methodology for the HDI. In their view, this would also avoid that the same gender disparity is penalized heavier at higher income levels. As of the 1999 report UNDP has taken these comments on board, and now computes the harmonic mean of the adjusted male and female average p.c. incomes.

There are two problems with the Bardhan and Klasen (1999) argument. First, it can be shown that the penalty for inequality is *not* higher at higher income levels. The multiplication with average

adjusted income per capita affects the ultimate *level* of the income component of the GDI, not the penalty. Countries at higher income levels will have the same fall in their GDI as compared to their HDI, in per cent, as countries at lower levels of average income. In absolute terms the scores of high income countries will fall more, but this is not the relevant measure. What does hold, however, is that the income component of the GDI is heavily influenced by the *level* of average income. But the average achievement also dominates the other two components of the GDI.

The second problem is that there does not seem to be a theoretical justification for discounting male and female average incomes before computing the penalty for the gap. What this method boils down to is that the *gap itself* is discounted: not only is the discount larger at higher levels of average (male and female) incomes, but also at larger *differences* between male and female average incomes (with a large gender gap, male incomes are far more discounted than female incomes). This is not in keeping with the basic reasoning for the HDI that focuses on well-being. According to empirical evidence on the satisfaction that is derived from incomes, *relative* income matters more than absolute income. This means there is no reason to discount the gap between male and female incomes, given that these men and women live in the same country. In fact, given that people compare their incomes with those of their neighbours and fellow countrymen, there would be more reason to give a higher penalty for the same gap at higher levels of income.

Table II illustrates the effect of the change in the computation of the income component of the GDI. Based on the data published in the technical note in the UNDP, 2000 Human Development Report, I take Ecuador as a starting point. The adjusted income p.c. for Ecuador (so the income component of the HDI) is 0.56. The female income share is 0.194. This gives a score for the income component of the GDI of 0.36 in the old method, or a penalty for inequality (HDI-GDI)/HDI of 37%. In the new system, where female and male average p.c. incomes are adjusted before computing the harmonic mean, the income component becomes 0.50. The penalty for inequality for this middle income country is reduced from 37% to 21%.

TABLE II

Computation of income component of the GDI according to old and new methods, for Ecuador and for three hypothetical countries

| Ecuador | share | inc p.c. | popul. | popshare | proportional income share | adj inc | harmonic mean of prop. inc. sh. | income component | | penalty | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | old | new | old | new |
| female | 0.194 | 1173 | 6060 | 0.50 | 0.39 | 0.41 | 0.63 | 0.36 | 0.50 | 0.37 | 0.11 |
| male | 0.806 | 4818 | 6115 | 0.50 | 1.60 | 0.65 | | | | | |
| total | | 3003 | 12175 | | | 0.57 | | | | | |
| Country C | | | | | | | | | | | |
| female | 0.194 | 7795 | 6060 | 0.50 | 0.39 | 0.73 | 0.63 | 0.56 | 0.83 | 0.37 | 0.06 |
| male | 0.806 | 32095 | 6115 | 0.50 | 1.60 | 0.96 | | | | | |
| total | | 20000 | 12175 | | | 0.88 | | | | | |
| Country D | | | | | | | | | | | |
| female | 0.4 | 2413 | 6060 | 0.50 | 0.80 | 0.53 | 0.96 | 0.55 | 0.56 | 0.04 | 0.01 |
| male | 0.6 | 3587 | 6115 | 0.50 | 1.19 | 0.60 | | | | | |
| total | | 3003 | 12175 | | | 0.57 | | | | | |
| Country E | | | | | | | | | | | |
| female | 0.4 | 16073 | 6060 | 0.50 | 0.80 | 0.85 | 0.96 | 0.85 | 0.88 | 0.04 | 0.01 |
| male | 0.6 | 23892 | 6115 | 0.50 | 1.19 | 0.91 | | | | | |
| total | | 20000 | 12175 | | | 0.88 | | | | | |

Source for data Ecuador: UNDP (2000).
Country C: higher income p.c., same population, same gender gap.
Country D: same income p.c., same population, smaller gender gap.
Country E: higher income p.c., same population, smaller gender gap.

For a hypothetical country with the same female and male income shares, the same population shares but a much higher income per capita, the income component of the HDI is 0.88 (Table II). The income component for the GDI in the old system is 0.56 and in the new 0.83. The penalty for inequality falls from 37% (which is indeed the same as in Ecuador) to 6%. In sum, as a result of the new method, the penalty for inequality is lower for countries at a higher level of income than for other countries.[3]

It should also be noted that the new system of discounting average male and female per capita incomes still implies double weighting for share in population: share in population is accounted for in computing female and male income per capita, and then again in computing the harmonic mean of the two adjusted average incomes. To do away with this redundancy, the population share can be skipped from the formula for harmonic mean. However, in order to have a result that is meaningful on a scale from 0 to 100, population shares should be replaced by 0.5 in the formula for the harmonic mean.

Table II also illustrates that the level of the GDI income component is heavily influenced by the level of income: in spite of the same gender income gap, the GDI income component of the hypothetical high-income country is much higher than the GDI income component of Ecuador. It is very difficult for poor countries to outperform rich countries on the GDI, no matter how equal they distribute their income. This also holds for the scores on health and education, the other two components of the GDI. As long as there is a gender gap, the GDI will be lower than the HDI. The procedure of multiplying with adjusted income is simply the consequence of the wish to have a measure that reflects absolute levels of human development as well as gender inequality.

For the GEM, all three indicators or variables involve female shares in a total (parliamentary seats, occupations, and income, see Table I). Theoretically, this could have led to a simple and direct measure of gender inequality for all three components: multiplying the female share by 2 would give a score on a scale from 0 to 100. However, in order to be "consistent with the methodology applied in the GDI" (UNDP, 1995, p. 132), UNDP opted for the use of population-weighted harmonic means again, to get "Equally

Distributed Equivalent Percentages" (EDEPs). These EDEPs are then multiplied by 2 to get a score between 0 and 100.

However, taking the harmonic mean means that the GEM is *not a direct measure of gender equality either*: the harmonic mean of female and male shares is higher than the female share, and thus softens inequality. While in the GDI this can be justified by the nature of the GDI itself, namely that it is meant to be a combination of abolute levels of achievements education, health and income, and relative female achievements, this same argument cannot be made for the components female share in parliament or female share in higher occupations. These shares do not provide a benchmark figure indicating the absolute development of "democracy" or the extent of progress towards higher labour market positions. The only thing that the harmonic mean does is to soften the inequality.

Another problem is the way income is treated in the GEM. The population-weighted harmonic mean is not taken from the income shares themselves and then multiplied by 2, as in the other variables of the GEM, but instead UNDP applies a similar methodology as in the GDI. It is odd that the three shares in the GEM are not dealt with in the same way.

But there is more. As in the GDI, shares in earned income are used to compute average female income p.c. and average male income per capita. These average incomes are then indexed and finally the population-weighted harmonic mean is taken. This again implies double weighting for the share in population. A more serious problem is that there is also a difference with the GDI: in indexing average incomes on a scale from 0 to 100, *unadjusted* income per capita is used. With an average male or female income p.c. of x, an assumed minimum of 100 and a maximum of 40 000, the index becomes:

$$(5) \qquad (x - 100)/(40\,000 - 100)$$

UNDP's motivation for taking unadjusted, and not adjusted income is that income in the GEM is valued as a source of power and not for its contribution to basic development (UNDP, 1995, p. 82). This may be so, but the result is that the absolute income level weighs even more heavily in the score for the income component of the GEM than in the GDI: rich countries have a much higher

score than poor countries. Since the GEM is based on three shares, it may give the impression that it is based on *relative* female power. In practice, however, absolute incomes have a very large impact.

The GEM is an odd combination of, on the one hand, two variables where *relative* female power is counted – albeit softened by their harmonic means –, and on the other, one variable in which the absolute income level per capita weighs heavily. Thus far, these problematic issues of the GEM have been neglected in the discussion.

A final remark which holds for both GDI and GEM is that the procedure of taking the harmonic mean of female and male scores punishes for inequality *no matter whether female scores are lower or higher than male scores* (see also Dijkstra and Hanmer, 2000). As a result, a country where women do better with respect to longevity and education has a lower score (all other things being equal) than a country where women and men have equal scores for these two variables. This happens to be the case of Norway, the country used as example in the 1997 *Human Development Report* to explain the methodology for the GDI. In other words, countries where women do better than men on some indicators cannot compensate for other inequalities but are additionally punished.

### *The Composite Index*

The third type of weakness of GDI and GEM lies in the construction of the final indices. In both GDI and GEM a simple arithmetic average is taken of the scores for the three indicators. UNDP argues that there are no reasons for the weights of the variables to be different. However, if the variances of the three indicators differ widely, the indicator with the largest variance has the strongest weight in the overall index (Harvey et al., 1990; Perrons, 1995; Sugarman and Strauss, 1988). For the GDI, the income variable has a much larger spread than the other two variables. Bardhan and Klasen (1999) computed the implied penalties for inequality for the three indicators of the GDI. They showed that the gap in income accounts for 85% of the total gender gap, on average. In fact, the indicator with most conceptual and methodological problems thus has the largest weight in the final outcome.

Bardhan and Klasen focused most of their attention to the GDI. The question is whether the GEM is also dominated by one or two variables. What matters is not the spread in the three initial shares, but the relative variation in the final outcomes of the computation on the three variables. For this reason I computed these outcomes and the standard deviation for a random group of high income, middle income and low income countries (Table III). The standard deviation of share in parliament is highest (27%) but the difference with the other two variables is not big (20% for share in high occupations, 21% for income).

What Table III also shows is that the income component of the GEM is very heavily, and even more than the GDI, influenced by absolute levels of income. Column (5) gives the index for average income per capita, (y – 100)/(40 000 – 100). The difference between (5) and (3) in fact represents the punishment for the unequal female and male share in income. Column (6) shows that inequality accounts only for a small share of the total score on the GEM income component. For half of the countries the share is smaller than 10%, and the average is 16%. Although the income component does not dominate the other two, as in the GDI, it can be stated that the income component of the GEM can hardly be considered a measure of gender equality.

*Alternatives*

The main criticism to GDI and GEM is that they do not measure gender inequality as such. They combine measures of absolute well being or income with some assessment of inequality. Therefore, neither GDI nor GEM can be used to analyse the relationship between gender equality and economic performance. In addition, there are problems with the way GDI and GEM are constructed, with the choice of indicators and the way these indicators are dealt with before they enter as components in the overall index. In developing an alternative index for gender equality, not so much can be improved in the choice of indicators since data availability is limited. However, it can be attempted to avoid the methodological problems.

Several alternative indices have been developed so far, in particular for the GDI. White's GEQ (Gender Equality index) is defined

TABLE III

Computation of GEM for 30 countries

| | (1) Index Parl. | (2) Index Am, Pt occupations | (3) Income component | (4) GEM | (5) Index GDP | (6) {(5) – (3)}/3, in % |
|---|---|---|---|---|---|---|
| Canada | 0.66 | 0.98 | 0.51 | 0.72 | 0.55 | 7 |
| France | 0.32 | 0.65 | 0.50 | 0.49 | 0.53 | 6 |
| Norway | 0.92 | 0.90 | 0.54 | 0.79 | 0.56 | 3 |
| USA | 0.39 | 0.99 | 0.64 | 0.67 | 0.67 | 5 |
| Iceland | 0.75 | 0.90 | 0.51 | 0.72 | 0.53 | 3 |
| Finland | 0.89 | 0.85 | 0.45 | 0.73 | 0.46 | 3 |
| Netherlands | 0.81 | 0.81 | 0.44 | 0.69 | 0.50 | 11 |
| Japan | 0.28 | 0.65 | 0.48 | 0.47 | 0.55 | 11 |
| New Zealand | 0.82 | 0.95 | 0.41 | 0.72 | 0.43 | 6 |
| Sweden | 0.96 | 0.94 | 0.47 | 0.79 | 0.48 | 1 |
| Suriname | 0.52 | 0.68 | 0.09 | 0.43 | 0.12 | 25 |
| Bulgaria | 0.38 | 0.90 | 0.11 | 0.46 | 0.11 | 4 |
| Turkey | 0.09 | 0.62 | 0.12 | 0.28 | 0.14 | 9 |
| Ecuador | 0.14 | 0.89 | 0.07 | 0.37 | 0.11 | 41 |
| Romania | 0.21 | 0.90 | 0.10 | 0.40 | 0.11 | 8 |
| Estonia | 0.38 | 0.91 | 0.10 | 0.46 | 0.10 | 3 |
| Iran | 0.18 | 0.50 | 0.08 | 0.26 | 0.13 | 41 |
| Syria | 0.34 | 0.52 | 0.08 | 0.31 | 0.13 | 38 |
| Algeria | 0.12 | 0.51 | 0.08 | 0.24 | 0.14 | 41 |
| Tunisia | 0.25 | 0.67 | 0.09 | 0.34 | 0.13 | 27 |
| Cameroon | 0.21 | 0.54 | 0.05 | 0.27 | 0.06 | 18 |
| Lesotho | 0.39 | 0.93 | 0.02 | 0.45 | 0.03 | 19 |
| Equatorial Guinea | 0.32 | 0.42 | 0.03 | 0.26 | 0.04 | 20 |
| Pakistan | 0.10 | 0.38 | 0.03 | 0.17 | 0.05 | 37 |
| India | 0.27 | 0.37 | 0.02 | 0.22 | 0.03 | 29 |
| Togo | 0.05 | 0.47 | 0.02 | 0.18 | 0.03 | 16 |
| Zambia | 0.34 | 0.54 | 0.02 | 0.30 | 0.02 | 6 |
| Bangladesh | 0.33 | 0.54 | 0.02 | 0.30 | 0.03 | 33 |
| Mauritania | 0.03 | 0.46 | 0.03 | 0.18 | 0.04 | 8 |
| CAR | 0.13 | 0.46 | 0.02 | 0.21 | 0.02 | 6 |
| | | | | | | average: |
| St dev | 0.27 | 0.20 | 0.21 | 0.20 | 0.22 | 16 |

Source: Computed on the basis of data in UNDP (1998). It is assumed that female population share is 51% in all countries.

as the ratio of GDI and HDI (White, 1997). Forsythe et al. (1998) focus on gender inequality (GI) which they define as (HDI-GDI)/HDI. These indices are similar and *do* measure equality, respectively inequality (see also Anand and Sen, 1995; UNDP, 1995, pp. 126, 129). However, they still suffer from the other limitations of the GDI, in particular, the peculiar way the income variable is defined and measured, and the fact that the variation in the overall index is dominated by the variation in relative income share.

Dijkstra and Hanmer (2000) developed a relative gender equality index (Relative Status of Women, RSW) by taking the same variables as the GDI but using relative achievements on the three variables. Although this is a more direct measure than the GEQ or the GI, the other criticisms still hold. Former socialist countries do well on this index since female labour market participation is high and the income variable dominates the overall index. GEQ, GI and RSW only include variables related to human development, and exclude the power dimension that is measured in the GEM.

Bardhan and Klasen (1999) have computed a revised GDI. Their GDI attempts to solve the *de facto* unequal weighting of the three components, in two ways: First, they limited the maxima and minima against which actual achievements in life expectancy and education are related to actual minima and maxima over all observations, thus broadening the range of possible achievements. Secondly, they used different "inequality aversion" factors epsilon for the different components, with the lowest epsilon for the income component and the highest for life expectancy (respectively 1.5, 3 and 6). Although this is an improvement of the GDI, this measure still compounds absolute levels of human development with relative female-male achievements.[4] In addition, using different inequality aversions for different variables appears to make the measure more subjective than it should be.

Apodaca (1998) develops an index composed of seven indicators that measure women's relative economic and social rights. However, some of the indicators she uses are problematic, and she does not solve the problem of the implicit unequal weights. This is what we will do now.

## TOWARDS A STANDARDISED INDEX OF GENDER EQUALITY (SIGE)

Ideally, a new measure of gender equality should meet the following requirements:

1. The index should comprise of a number of indicators that, taken together, represent all relevant dimensions of gender equality;
2. It should be a relative measure, that is, it should measure gender (in)equality and not some combination of absolute well-being and inequality;
3. The construction of the overall index should be such that there is no unintended weighing of some factors more heavily than other factors.

A further, practical necessity is that data should be available for many countries, should be internationally comparable and as reliable as possible. Data availability is an important constraint, and even if data are available, they are not always reliable. The database I use here is the Women's Statistics Database (WISTAT) as developed by the UN and available on CD-ROM. The sources for these data include internationally available statistics such as the International Demographic and Health Surveys and the Yearbooks of International Labour Market Statistics of the ILO. For some data, WISTAT used national surveys, if available. I used the data from the 1994 series, which was the latest series available in WISTAT, but in practice data were often from (around) 1990. This means the information is not very recent. For example, data for former socialist countries reflects the situation of these countries when they were still subject to central planning. Our index can only be considered an illustration of what is possible on the basis of available statistics. It should not give rise to conclusions on the current state of gender equality in the different countries.

Furthermore, the knowledge of what the relevant dimensions of gender equality are, and how these dimensions can be measured, is limited. This holds, in particular, for measuring gender equality in international perspective.

Possible dimensions of gender equality that can be used in cross-country comparisons were discussed in a Workshop held some years ago in The Hague. This was a unique setting in which

researchers from many different cultures and from different disciplines participated.[5] The explicit aim of the Workshop was to define important aspects of gender equality and inequality that may hold in different cultures. The following eight dimensions were identified (Wieringa, 1997a):

1. Gender identity, which includes cultural issues such as the socialisation of girls and boys, the rigidity of the sexual division of labour;
2. Autonomy of the body, which refers to the absence of gender-based violence, control over sexuality, and control over reproduction;
3. Autonomy within the household. This encompasses the freedom to marry and divorce, right to custody in case of divorce, and decision-making power and access to assets within the household;
4. Political power, which includes decision-making at above-household levels such as municipalities, unions, government, and parliament;
5. Social resources, which refers to the access to health and education;
6. Material resources, which refers to access to land, houses, and credit;
7. Employment and income; this dimension is about the distribution of paid and unpaid work, wage differentials, formal and informal labour;
8. Time; this is a separate indicator, and includes the relative access to leisure and sleep.

Behind these eight different dimensions, four factors can be identified: 1) culture, that is, ideas on what is masculine and feminine, 2) power, 3) access to social assets, and 4) access to economic assets. Culture is most closely related to gender identity, but is also of influence on all other dimensions. Power also plays a role in all eight dimensions, but it is most explicitly related to dimension 4. Dimension 5 of the Workshop was about access to social assets and dimensions 6 and 7 deal with access to economic resources. Time, in so far as it is access to leisure and sleep, is a social resource, but it is also an economic resource.

Unfortunately, it is not possible to use internationally available data for all dimensions as identified in the Workshop. It is particularly difficult to find data for gender identity, or more generally, for the cultural factor. However, cultural factors can be expected to influence many gendered statistics that *are* available. For example, culture will be of influence on women's access to education, as well as on their relative position in the labour market and in parliaments. For autonomy of the body no internationally available statistics are available either. Another dimension, for which no data are available yet on a sufficient scale, is time use. In OECD countries, time use data is generally registered. UNDP (1995) published data for gendered time use for eight former socialist countries and nine developing countries, but in total this gives data for only 31 countries.

It is important to include several different aspects or dimensions of gender equality in the new index. All participants in the discussion considered the above-mentioned eight dimensions important, but it was clear that some of them were more important in some countries than in others. In some countries, for example, there is no difference in access to education for boys and girls, while women and men still hold unequal positions in the labour market. Similarly, in some countries women have access to the labour market but at the cost of having much less time for leisure and sleep, or vice versa: women have more leisure than men but do not earn their own incomes. This means that *the different dimensions of gender equality may move together, but not necessarily so.*

### *The Choice of Indicators*

In the following, I examine a set of variables for which data are readily available, analysing what dimension of gender equality they represent and how well they represent it. These variables are given an operational definition by assigning indicators to them. The choice closely follows the indicators used by UNDP for constructing GDI and GEM, albeit that the way they enter the index is different. The following five variables are examined:

1. Relative female/male access to education
2. Relative female/male longevity (life expectancy)
3. Relative female/male labour market participation

4. Female share in technical and professional, and administrative and management positions
5. Female share in parliament.

1. *Access to education*

Relative access to education is perhaps the most important and most universal indicator for gender equality. It is one of the components of dimension 5, access to social resources. But there is also a relationship with access to economic resources: the higher the education levels, the more chances women have to improve employment status and income. Furthermore, higher relative education will also increase women's autonomy in the household and women's power at above household levels. Finally, a relation with culture can be assumed: if women and girls have more access to education this reflects cultural changes in society, and it will in turn allow more cultural changes in favour of women to come about.

For this education variable I use the same indicators as UNDP has done for the GDI (UNDP, 1995), with the same weights: 2/3 for literacy and 1/3 for combined primary and secondary school enrolment. Although this indicator is relatively undisputed, some criticism can be raised, in particular to the use of school enrolment ratios. These ratios say relatively little on school attendance and performance. In addition, school enrolment may be high if there is a lot of repetition: if many relatively old children are enrolled, enrolment rates are raised artificially since the denominator is based on a certain age cohort. However, since enrolment rates only constitute 1/3 of this indicator, this problem is not considered to be very serious. A difference with the GDI is that I do not take a harmonic mean of female and male achievements, but simply use the relative female/male achievement.

2. *Relative access to health*

The relative health situation of women can be captured by relative figures on female/male life expectancy. This indicator reflects eventual discrimination in access to health services (dimension 5), and through this, it may reflect cultural ideas on women and men. But it also measures to some extent women's relative access to leisure and sleep, since more sleep and more leisure will generally foster a

longer and healthier life. Since no direct data on access to leisure and sleep (dimension 8) are available for a sufficient number of countries, this is an advantage.

UNDP (1995) also uses relative life expectancy figures in the GDI, but corrects them for the fact that women live, on average, five years longer than men. Since the data are transformed and standardised before they enter the overall index (as explained below), I do not need to apply any correction: the higher the relative female/male life expectancy is, the better the relative health situation of women is.

3. *Relative female/male labour market participation*

This can be measured by the ratio of the female economic activity rate and the male economic activity rate. Participation in the labour market is generally considered a sign of female emancipation. It usually provides women with an independent income, and many jobs give women access to some power. Labour market participation is also assumed to foster women's relative autonomy in the household. However, these positive consequences depend on the *kind* of integration in the labour market.

Unfortunately, the definitions on "economically active population" vary by country and sometimes by region within countries. In some countries/regions, unpaid family labour and work in the subsistence economy are included, in others they are not. For example, the relative female/male labour market participation is 18 in Mali and 56 in Togo – both West African countries between which relative female labour market participation cannot be expected to differ very much. The large difference must therefore be due to different operational definitions. Bardhan and Klasen (1999) report large differences even within one country, namely between Indian states. Obviously, unpaid family labour does not give women an independent income, nor does it lead to more autonomy in the household. Another problem with this indicator is that a high relative female labour market participation may imply a double burden for women. If women's household and caring tasks are not shared with men, the positive effect of labour market participation is offset by a negative effect on women's access to leisure and sleep, and so

on women's well-being and health. Since I intend to include an indicator for health, this is not so problematic.

The income dimension is only captured to a limited extent by this indicator. It is of course possible to multiply this ratio by relative female/male wages, as UNDP does for the GDI, but for most countries these data are not available. Taking an average of 75% for all these countries, as UNDP does, is not useful in the context of this alternative measure since values will be standardised later on, and multiplying all values by a constant does not change standardised outcomes.

4. *Female share in technical and professional, and in administrative and management positions*

This indicator is used by UNDP as part of the GEM. It is a measure of access to economic assets, since these jobs are relatively better paid than many other jobs. Access to administrative and management positions reflects to some extent decision making power in society, while access to technical and professional occupations reflects opportunities for career development (UNDP, 1995). At the same time, this indicator is also an approximation for relative female participation in the *formal* labour market (as opposed to labour market participation in general which may be in unpaid family labour), albeit that not all sectors are represented.

This indicator is much less sensitive to statistical conventions than the one on relative labour market participation. It also says something on relative female power. The higher the share of women in these positions, the more power women have in society relative to men. Women in these formal labour market positions will, on average, also have more power and autonomy in the household. In addition, this indicator reflects aspects of culture. And in comparison to the female share in parliament (see below), it is much less sensitive to the particular year in which it is registered.

5. *Female share in parliament*

This is an obvious indicator for relative female power in society. However, the limitations of this indicator are well-known and have been pointed out above: it only includes female power at national level, in some countries parliaments have little power, it is only about formal power, and the figure is sensitive to the particular year

in which it is measured. Nevertheless, it seems to be an important indicator for relative female power. One can assume that there is also a relationship between this indicator and cultural factors, as well as with autonomy in the household. Women cannot be members of parliament if they are not allowed to "go out" by their husbands or fathers. The main advantage of this indicator is that data are available for many countries.

*The Composite Index*

If the different variables of an index move together, it is possible to apply an empirical analysis for the decision on which of these indicators to include in the overall index. For example, in constructing an index of labour market inequality, the different indicators are expected to have a high correlation with each other (see, Sugarman and Straus, 1988). In that case, the internal consistency of the scale can be examined by computing the "Cronbach alpha." Those indicators with a too low correlation with the other indicators and with the overall index are removed. However, as noted above, the different dimensions of gender equality may move together but may also move in opposite directions. This implies that I cannot rely on an empirical analysis. The presence or absence of a relationship with other indicators does not say anything on the validity of inclusion of the indicator in the overall index.

From the qualitative discussion above, it seems a good choice to include all five indicators: there are two variables for access to social assets, two variables for the labour market, and one for relative power in society. Although all have their weaknesses, the combination of the five and giving them equal weight can be expected to minimise distortions.

In order to combine these indicators in one index, some elaboration of the raw data is necessary. All five are *relative* indicators: female achievements divided by male achievements, or female shares (Table IV). In order to avoid the unintended overweighting of one indicator above others, it is necessary to standardise the raw data. For the construction of the overall index, I standardised the initial scores expressing them as number of standard deviations from the mean of the series, as follows:

$$z_{ij} = (x_{ij} - \mu_j)/\sigma_j \tag{6}$$

TABLE IV

The computation of the Standardized Index of Gender Equality (SIGE)

| Variable | Indicator | Transformation/ standardisation | Index |
|---|---|---|---|
| Education | Relative female/male literacy rates (2/3);<br>relative female/male combined enrolment rate (1/3);<br>weighted average | yes (power 5), yes | Simple arithmetic average of standardised scores |
| Health | Relative female/male life expectancy | no, yes | |
| Labour market participation | Relative female/male economic activity rate | no, yes | |
| Share in higher labour market occupations positions | Female share in technical and professional, and administrative and management positions | no, yes | |
| Share in parliament | Female share in parliamentary seats | yes (power 0.5), yes | |

Source: text.

Where:

$z_{ij}$ = standardised score of country i on indicator j, j = 1–5
$x_{ij}$ = score of country i on indicator j, j = 1–5
$\mu_j$ = arithmetic mean of scores of all countries on indicator j
$\sigma_j$ = standard deviation of scores of all countries on indicator j

However, mean and standard deviation cannot be meaningfully used if the distribution is not approximately normal. For this reason, some series had to be transformed.[6] The standardisation has been applied to the transformed scores. Finally, a Standardised Index of Gender Equality (SIGE) was computed by taking a simple arithmetic mean of the standardised and sometimes first transformed, scores on the indicators. The index $Z_i$ for each country *i* is therefore:

$$(7) \qquad Z_i = \left\{ \sum_{j=1}^{5} z_{ij} \right\} /5$$

## RESULTS AND FURTHER ANALYSIS

The Appendix Table shows the results of combining these five indicators in one index, the Standardised Index for Gender Equality (SIGE). The index could be computed for 115 countries. Figures run from small negative to small positive numbers, with an average close to zero. Finland comes on top, followed by Sweden and Denmark. The Table also shows the original scores for each of the five indicators, and the rank of each country on each separate indicator (in italic).

Finland has high ranks for all five indicators, and scores best on female representation in parliament. Sweden owes its high score to the high female share in professional, technical, administrative and management positions (STPAM), but also scores well on parliamentary representation (SPAR). Apart from several other industrialised countries (Norway, Canada, Austria), some former socialist countries also do well on this Index (Poland, Hungary, Bulgaria). The Appendix Table shows that this is not so much due to their score on female share in parliament, as would be expected, but more to the high scores on the two labour market variables: relative female labour market participation (REAP) and STPAM. Poland also has a high score on relative life expectancy for women (RLEXP).

Some Caribbean countries can also be found relatively high: Jamaica (7), Barbados (11), Guyana (12), Suriname (20), Cuba (21), and Trinidad and Tobago (22). These countries score well on labour market participation, with the exception of Guyana, which owes its relatively high score to high female parliamentary representation. Nicaragua is the highest Latin American country (at 15), probably due to the socialist policies in the 1980s that improved women's relative access to social resources. El Salvador is in the 25th position. In the ranks between 34 and 82 we find all other Latin American and Caribbean countries. The Philippines is the Asian country with the highest rank (24), followed by Thailand (30) and China (43). Most Asian countries are in much lower ranks, however. Predominantly Muslim countries Bangladesh, Afghanistan and Pakistan close the list. The highest African country is the relatively rich Botswana (at 33), and Swaziland (37) and Lesotho (38) follow this country. Rwanda is also just within the first 50, due to its high rank (1st) on relative female labour market participation

(REAP). Most Sub-Saharan African countries can be found between ranks 50 and 100, however, while most North African countries can be found between 103 and 112.

Surprisingly, the empirical results for the much criticised indicator female share in parliament do not seem to deviate much from what one would expect *a priori*. In all countries the share of women in parliament is low, but it is relatively higher in western countries where one would expect values that accept women in higher positions to have changed most. Finland scores highest, while Norway, Sweden, Denmark and the Netherlands are in places 3–6. One exception to this rule is Guyana that ranks 2d on this variable. The "(former) socialist country effect" does seem to hold, however, for Cuba and China, respectively 7th and 9th on this indicator.

El Salvador has the highest score for relative life expectancy (RLEXP), while Nicaragua ranks 4th on this indicator. These high scores are probably due to the civil wars that these countries had just gone through and that took more losses among the male population. Some former socialist countries (Poland, Hungary) also do well on this indicator. Again, this seems more the result of higher male mortality, perhaps due to high alcohol abuse among men. In the US, the relatively high score may be due to the fact that men are more often victims of criminality.

With respect to relative female labour market participation (REAP), Rwanda comes in first place, followed by Mozambique and Benin. It is clear that statistical conventions in these countries allow for including women working as unpaid family members in subsistence agriculture in the registered labour force. In other countries, such as Guatemala or the earlier mentioned Mali, this is probably not the case. Although this obviously distorts the results, the inclusion of the other labour market variable STPAM corrects the distortion to some extent.

### *Relationships between Dimensions*

When trying to combine a smaller number of indicators in one Index, the distortions caused by disadvantages of particular indicators come to the fore more sharply. For example, a subset of three indicators that includes life expectancy brings El Salvador to a much higher position. Subsets that include two labour market variables

TABLE V

Linear bivariate correlation coefficients between SIGE5 and components, in per cent

| | REDUC | RLEXP | REAP | STPAM | SPAR | SIGE5 |
|---|---|---|---|---|---|---|
| REDUC | | 52** | 2 | 73** | 43** | 78** |
| RLEXP | 52** | | 34** | 40** | 34** | 71** |
| REAP | 2** | 34** | | 22** | 46** | 51** |
| STPAM | 73** | 40** | 22** | | 38** | 81** |
| Table | | | | | | |
| SPAR | 43** | 34** | 46** | 38** | | 69** |
| SIGE5 | 78** | 71** | 51** | 81** | 69** | |

Source: Own computations.
** Correlation is significant at 0.01 level.

in addition to education give higher results for the former socialist countries. An Index combining REDUC, STPAM and SPAR gives a similar rank as SIGE5.

In order to examine the relationships between these indicators, I used the transformed data (where applicable) for the five variables. Table V presents the correlation coefficients between these (transformed) five indicators. Relative access to education (REDUC) proves to have rather high and statistically significant correlations with relative life expectancy (RLEXP), female share in parliament (SPAR) and, above all, with female share in technical and professional, and administrative and management positions (STPAM). Surprisingly, the correlation between REDUC and REAP proves to be almost zero and is statistically insignificant.

The relative female/male activity rate (REAP) proves to have a rather low (22%) but significant correlation with STPAM. The relationship between relative life expectancy and the two labour market indicators is positive and significant, but not very high. It is higher for STPAM than for REAP. This does not rule out the possibility of a trade-off between a higher work burden as reflected in participation in the labour market and women's relative health, but it seems that relative labour market participation and relative health also move together. They appear to be related more strongly if we deal with participation in white-collar jobs than for jobs in

general. The female share in parliament has a positive and significant correlation (ranging between 32 and 46%) with all other indicators.

As could be expected, the correlation between the overall index SIGE5 and its components is high and significant. It is highest for STPAM and REDUC, and lowest for REAP. The presence or absence of linear relationships between the components is also confirmed in Figure 1, which shows bivariate scatter plots. By looking at the plots, non-linear relationships can be discerned. The plot for REAP with REDUC confirms the heterogeneous nature of data on relative economic activity rate: in many countries, a high score means that women are highly represented in the agricultural subsistence sector or as unpaid family workers, with low education; in other countries, it points to a high participation in the formal labour market and it is accompanied by high relative education. The relationship has the form of a "U." There is high relative labour market participation at low relative education levels, and at high relative educational levels, while it is low at middle educational levels.

Goldin (1994) found a U-shaped relationship between economic development, measured as GDP per capita, and a related indicator, namely absolute female labour market participation. She explains it as follows. At low levels of development female labour market participation is high but is concentrated in agricultural activities. When education begins to become available, boys benefit first. General income levels rise but female labour market participation decreases, both because of the (family) income effect and because of a "stigma" (taboo) on married women's outside work. At higher levels of income, girls also get access to education. In addition, the service sector expands. The stigma is weaker for the service sector than for manufacturing. These two factors explain the right side of the "U." Possibly, these factors can also explain the U-formed relationship between relative labour market participation and variables such as relative female access to education.

### *Comparison with GDI and GEM*

Finally, we compare the results on SIGE5 with those for UNDP's indices GDI and GEM. SIGE more or less integrates the dimen-

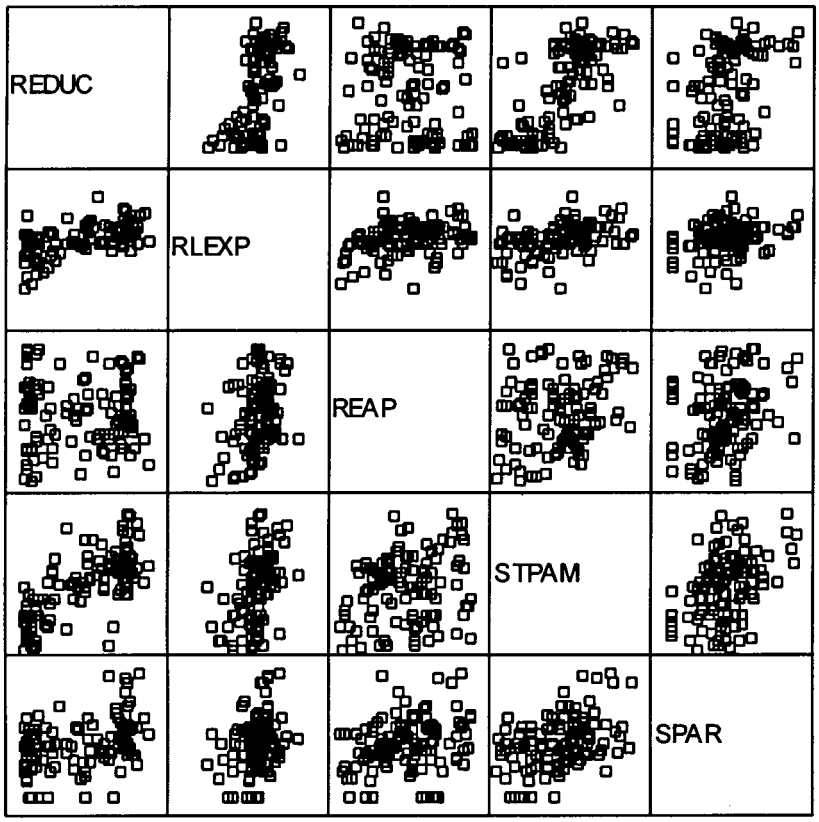


*Figure 1.* Scatter plot of bivariate relationships between the five components of SIGE: Relative Education (REDUC), Relative Life Expectancy (RLEXP), Relative Female Labour Market Participation (REAP), Share in Technical, Professional, Administrative and Management Positions (STPAM) and Share in Parliament (SPAR).

sions of GDI (education, life expectancy, and income) and GEM (female share in high labour market positions, in parliament, and income again). However, as explained above, GDI and GEM combine assessments of gender inequality with absolute scores on the different dimensions. In addition, most of the variation in the GDI is explained by the variation in the income variable, which in itself is partly dependent on the absolute income level. In the GEM, the income variable is less dominant in the overall score, but the score on the income variable is influenced strongly by the level of average income per capita. As a result of these characteristics,

the scores on both GDI and GEM can be expected to be biased towards countries at higher average income levels. When comparing the scores on SIGE, GDI and GEM we would expect to find some evidence for this bias: at least some countries with low average income can be expected to receive higher scores on SIGE than on GDI and/or GEM, and vice versa.

It is difficult to compare *scores* on the different measures, since the range of possible scores of SIGE is not equal to the range of possible scores on GDI and GEM. But it is possible to compare countries' rankings. Table VI presents the ranks for a group of 25 countries at the top of the SIGE list (only including countries for which scores on SIGE, GDI and GEM are available), and for a group of 13 countries at the bottom of the SIGE ranking – the latter listed in reverse order.[7]

For the four Nordic countries and also for the numbers 9–11 on the SIGE list (Canada, Austria and Barbados), there is hardly any difference between the rankings on the three indices. However, for most other countries the rankings differ. Countries such as Poland, Hungary, but also Nicaragua, Suriname and El Salvador seem to reflect the "income effect" as they have much higher SIGE rankings than GDI or GEM rankings. On the other hand, richer countries such as the USA and New Zealand fall on the SIGE list as compared to the GDI and GEM lists, meaning that they owe their high ranks on GDI and GEM at least in part to their high absolute income levels. For the Netherlands and Luxembourg, a similar income effect holds for the GEM, but not for the GDI: their GDI ranking is lower than the SIGE ranking. This is an interesting outcome, and probably reflects the dominance of the income variable in the GDI. In both countries the female share in earned income is relatively low (25 and 23 percent, respectively, see, UNDP, 1995, p. 76). France, on the other hand, has a relatively high GDI, reflecting a much higher female share in earned income (36%), while its GEM ranking is lower than the SIGE ranking. This country has a relatively low female share in parliament (see Appendix table), which is only one out of five variables in the SIGE but one out of three in the GEM. The GDI ranks of Cuba and of Trinidad and Tobago also seem to be lower due to the lower average income levels in these countries

TABLE VI

Rank comparison SIGE, GDI and GEM

| | SIGE rank | GDI rank | GEM rank | SIGE-GDI | SIGE-GEM |
|---|---|---|---|---|---|
| *Top:* | | | | | |
| Finland | 1 | 2 | 3 | –1 | –2 |
| Sweden | 2 | 1 | 1 | 1 | 1 |
| Denmark | 3 | 4 | 4 | –1 | –1 |
| Poland | 4 | 22 | 32 | –18 | –28 |
| Norway | 5 | 3 | 2 | 2 | 3 |
| Hungary | 6 | 23 | 18 | –17 | –12 |
| Canada | 9 | 9 | 5 | 0 | 4 |
| Austria | 10 | 10 | 9 | 0 | 1 |
| Barbados | 11 | 11 | 12 | 0 | –1 |
| USA | 13 | 5 | 8 | 8 | 5 |
| Nicaragua | 15 | 73 | 34 | –58 | –19 |
| Netherlands | 16 | 20 | 7 | –4 | 9 |
| France | 17 | 7 | 31 | 10 | –14 |
| New Zealand | 19 | 12 | 6 | 7 | 13 |
| Suriname | 20 | 54 | 64 | –34 | –44 |
| Cuba | 21 | 47 | 16 | –26 | 5 |
| Trinidad and Tobago | 22 | 36 | 15 | –14 | 7 |
| Luxembourg | 23 | 35 | 13 | –12 | 10 |
| Philippines | 24 | 64 | 28 | –40 | –4 |
| El Salvador | 25 | 76 | 44 | –51 | –19 |
| *Bottom, in reverse order:* | | | | | |
| Pakistan | 1 | 28 | 3 | –27 | –2 |
| Afghanistan | 2 | 1 | 1 | 1 | 1 |
| Tunisia | 4 | 72 | 26 | –68 | –22 |
| India | 5 | 32 | 16 | –27 | –11 |
| Mauritania | 6 | 15 | 6 | –9 | 0 |
| Egypt | 7 | 39 | 21 | –32 | –14 |
| Iran | 8 | 65 | 22 | –57 | –14 |
| Morocco | 9 | 38 | 32 | –29 | –23 |
| Nepal | 10 | 16 | 44 | –6 | –34 |
| Comorros | 11 | 33 | 4 | –22 | 7 |
| Mali | 12 | 3 | 20 | 9 | –8 |
| Papua New Guinea | 13 | 45 | 17 | –32 | –4 |

Source for SIGE: Appendix Table, for GDI and GEM: UNDP, 1995.

while these countries have relatively high gender equality in the education and health dimensions.

At the bottom of the SIGE list, the income effect is most clearly visible for countries such as Tunisia, Egypt, Iran and Morocco, and to some extent also for India and Papua New Guinea. These countries with high gender inequality do not have such low GDI and GEM rankings because their average income levels are not at the bottom. The income effect also explains why Pakistan (real GDP per capita of PPP$2890, see, UNDP, 1995, p. 157) has a much higher score on the GDI than Afghanistan ($819) and Comorros ($1350). In sum, the comparisons show that there is indeed evidence for a bias in the GDI and GEM scores towards higher average income levels. The SIGE on the other hand is really measuring gender inequality regardless of absolute levels of income or absolute scores on other dimensions.

## CONCLUSION

It is important to develop a measure of gender equality that can be used to compare different countries and to assess progress in countries over time. Furthermore, such a measure can be used to examine the relationship between gender equality and economic performance. This paper has analyzed the two measures developed by UNDP, the GDI and the GEM (UNDP, 1995). It shows that they are not suitable for examining this relationship, because absolute levels of development weigh heavily in these measures. GDI and GEM also suffer from some other methodological problems.

The second part of the paper develops an alternative measure of gender equality, the "Standardised Index of Gender Equality" (SIGE). This measure attempts to encompass all possible dimensions of gender equality and it avoids the conceptual and methodological problems of GDI and GEM. It is really an assessment of relative female power and relative female access to assets. Obviously, SIGE is not *the* ultimate measure of gender equality. More international comparable data are necessary, in particular, on time use. However, SIGE can serve as a first approximation of such an overall index.

Appendix Table

Countries ranked according to SIGE, with scores and ranks (in italics) on five components

| | *Country* | *REDUC* | | *RLEXP* | | *REAP* | | *SPTAM* | | *SPAR* | | *SIGE5* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Finland | 102.9 | *3* | 111.4 | *5* | 83.4 | *8* | 55.7 | *8* | 39.0 | *1* | 1.70 |
| 2 | Sweden | 100.7 | *18* | 108.0 | *40* | 78.2 | *15* | 63.6 | *1* | 33.5 | *4* | 1.44 |
| 3 | Denmark | 100.7 | *19* | 108.4 | *36* | 77.9 | *16* | 56.0 | *7* | 33.0 | *5* | 1.33 |
| 4 | Poland | 99.7 | *31* | 112.7 | *2* | 80.1 | *13* | 59.1 | *4* | 9.3 | *42* | 1.25 |
| 5 | Norway | 100.3 | *21* | 109.3 | *20* | 68.3 | *21* | 49.8 | *14* | 35.8 | *3* | 1.22 |
| 6 | Hungary | 100.1 | *23* | 112.4 | *3* | 76.3 | *17* | 52.4 | *11* | 7.3 | *56* | 1.05 |
| 7 | Jamaica | 102.3 | *4* | 106.3 | *74* | 83.3 | *9* | 59.6 | *3* | 12.4 | *26* | 1.01 |
| 8 | Bulgaria | 92.9 | *54* | 109.3 | *22* | 85.3 | *5* | 54.1 | *9* | 12.9 | *22* | 0.94 |
| 9 | Canada | 100.0 | *25* | 109.3 | *21* | 64.8 | *29* | 49.4 | *15* | 13.2 | *21* | 0.83 |
| 10 | Austria | 100.8 | *15* | 109.4 | *18* | 61.6 | *35* | 39.3 | *49* | 21.1 | *8* | 0.81 |
| 11 | Barbados | 99.3 | *34* | 107.0 | *60* | 82.0 | *10* | 45.5 | *25* | 14.3 | *19* | 0.78 |
| 12 | Guyana | 96.7 | *46* | 109.4 | *19* | 33.6 | *88* | 45.1 | *26* | 36.9 | *2* | 0.77 |
| 13 | United States | 100.1 | *24* | 109.7 | *14* | 67.2 | *24* | 46.2 | *22* | 10.3 | *37* | 0.76 |
| 14 | Germany | 98.4 | *39* | 109.0 | *27* | 60.2 | *39* | 42.1 | *38* | 20.0 | *10* | 0.74 |
| 15 | Nicaragua | 103.9 | *2* | 111.9 | *4* | 33.8 | *86* | 38.2 | *53* | 16.3 | *14* | 0.70 |
| 16 | Netherlands | 100.0 | *26* | 108.8 | *30* | 44.1 | *66* | 38.1 | *54* | 28.0 | *6* | 0.67 |
| 17 | France | 101.3 | *10* | 111.4 | *6* | 64.4 | *30* | 40.9 | *43* | 5.7 | *68* | 0.67 |
| 18 | Romania | 102.3 | *5* | 109.0 | *26* | 84.9 | *6* | 43.4 | *32* | 2.9 | *93* | 0.67 |
| 19 | New Zealand | 100.4 | *20* | 108.6 | *32* | 53.0 | *51* | 42.6 | *36* | 16.5 | *13* | 0.64 |
| 20 | Suriname | 101.2 | *11* | 107.5 | *51* | 41.2 | *71* | 62.5 | *2* | 5.9 | *66* | 0.57 |
| 21 | Cuba | 101.0 | *12* | 104.8 | *97* | 48.0 | *61* | 47.1 | *19* | 22.8 | *7* | 0.55 |
| 22 | Trinidad and Tobago | 98.2 | *40* | 107.4 | *53* | 42.7 | *68* | 49.0 | *16* | 17.7 | *11* | 0.54 |
| 23 | Luxembourg | 100.8 | *13* | 110.6 | *9* | 45.1 | *63* | 35.6 | *64* | 13.3 | *20* | 0.54 |
| 24 | Philippines | 99.8 | *30* | 106.1 | *82* | 45.8 | *62* | 57.6 | *6* | 11.2 | *34* | 0.54 |
| 25 | El Salvador | 93.8 | *53* | 115.1 | *1* | 33.9 | *85* | 40.7 | *45* | 8.3 | *48* | 0.54 |
| 26 | Yugoslavia (former) | 91.5 | *57* | 108.1 | *38* | 62.2 | *33* | 44.7 | *28* | 15.6 | *17* | 0.53 |
| 27 | Belgium | 100.0 | *27* | 109.2 | *23* | 48.9 | *59* | 43.4 | *33* | 10.1 | *38* | 0.52 |
| 28 | Switzerland | 99.0 | *37* | 109.2 | *24* | 54.9 | *45* | 33.5 | *70* | 15.9 | *15* | 0.50 |
| 29 | Australia | 100.7 | *16* | 108.7 | *31* | 61.4 | *36* | 33.3 | *71* | 12.6 | *24* | 0.50 |
| 30 | Thailand | 97.0 | *44* | 108.0 | *41* | 81.1 | *11* | 43.9 | *30* | 3.7 | *88* | 0.48 |
| 31 | Uruguay | 100.8 | *14* | 109.4 | *17* | 43.7 | *67* | 50.8 | *13* | 4.6 | *80* | 0.47 |
| 32 | Portugal | 91.2 | *58* | 110.1 | *12* | 52.6 | *52* | 47.5 | *18* | 8.7 | *45* | 0.46 |

Appendix Table

Continued

| | *Country* | *REDUC* | | *RLEXP* | | *REAP* | | *SPTAM* | | *SPAR* | | *SIGE5* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 33 | Botswana | 84.1 | *70* | 110.8 | *8* | 50.7 | *56* | 58.5 | *5* | 5.0 | *77* | 0.46 |
| 34 | Venezuela | 98.9 | *38* | 109.2 | *25* | 38.9 | *74* | 46.6 | *21* | 9.2 | *43* | 0.43 |
| 35 | Ireland | 101.4 | *8* | 107.9 | *42* | 42.0 | *70* | 41.4 | *41* | 12.4 | *25* | 0.42 |
| 36 | Argentina | 101.7 | *7* | 110.0 | *13* | 38.3 | *76* | 46.7 | *20* | 4.6 | *81* | 0.41 |
| 37 | Swaziland | 95.3 | *50* | 106.7 | *68* | 62.0 | *34* | 51.7 | *12* | 5.7 | *67* | 0.39 |
| 38 | Lesotho | 90.6 | *60* | 109.0 | *28* | 71.7 | *18* | 53.4 | *10* | 1.5 | *102* | 0.39 |
| 39 | Italy | 99.0 | *36* | 108.9 | *29* | 45.0 | *65* | 41.3 | *42* | 8.6 | *46* | 0.37 |
| 40 | Spain | 99.3 | *35* | 108.5 | *34* | 31.5 | *91* | 41.7 | *39* | 14.6 | *18* | 0.36 |
| 41 | Chile | 99.9 | *29* | 110.3 | *11* | 39.1 | *73* | 41.5 | *40* | 6.0 | *65* | 0.36 |
| 42 | United Kingdom | 100.7 | *17* | 107.7 | *46* | 60.3 | *38* | 33.6 | *69* | 7.3 | *57* | 0.31 |
| 43 | China | 81.2 | *71* | 104.4 | *99* | 80.7 | *12* | 36.7 | *59* | 21.0 | *9* | 0.28 |
| 44 | Rwanda | 67.5 | *84* | 107.1 | *59* | 89.1 | *1* | 31.3 | *77* | 17.1 | *12* | 0.27 |
| 45 | Japan | 100.3 | *22* | 107.6 | *49* | 59.2 | *40* | 33.3 | *72* | 6.4 | *62* | 0.25 |
| 46 | Israel | 97.1 | *42* | 104.9 | *95* | 50.6 | *57* | 47.7 | *17* | 9.2 | *44* | 0.23 |
| 47 | Honduras | 101.3 | *9* | 106.7 | *67* | 23.3 | *103* | 44.9 | *27* | 11.7 | *30* | 0.22 |
| 48 | Mexico | 95.6 | *47* | 109.7 | *15* | 37.3 | *78* | 38.8 | *51* | 7.3 | *55* | 0.20 |
| 49 | Dominican Rep. | 104.4 | *1* | 106.6 | *70* | 17.8 | *108* | 43.6 | *31* | 10.0 | *39* | 0.19 |
| 50 | Costa Rica | 99.9 | *28* | 106.3 | *75* | 28.3 | *93* | 39.5 | *48* | 12.3 | *27* | 0.13 |
| 51 | Panama | 99.7 | *32* | 105.6 | *93* | 38.7 | *75* | 44.5 | *29* | 7.5 | *53* | 0.13 |
| 52 | Colombia | 101.9 | *6* | 108.5 | *33* | 28.3 | *94* | 39.7 | *46* | 4.6 | *83* | 0.12 |
| 53 | Burundi | 64.6 | *86* | 107.3 | *56* | 86.4 | *4* | 28.8 | *81* | 9.9 | *41* | 0.06 |
| 54 | Zimbabwe | 88.4 | *64* | 106.2 | *80* | 52.3 | *54* | 36.1 | *60* | 11.6 | *33* | 0.04 |
| 55 | Indonesia | 87.4 | *65* | 106.0 | *84* | 45.1 | *64* | 39.3 | *50* | 12.2 | *29* | 0.02 |
| 56 | Mauritius | 91.8 | *56* | 110.6 | *10* | 35.4 | *83* | 38.5 | *52* | 3.0 | *91* | 0.02 |
| 57 | Cyprus | 95.6 | *48* | 105.9 | *88* | 55.4 | *44* | 36.0 | *61* | 5.4 | *73* | 0.01 |
| 58 | Haiti | 89.8 | *62* | 106.3 | *77* | 69.7 | *19* | 37.9 | *55* | 3.0 | *92* | 0.01 |
| 59 | Sri Lanka | 94.3 | *52* | 106.2 | *79* | 36.9 | *79* | 45.8 | *24* | 4.9 | *78* | –0.01 |
| 60 | Mozambique | 43.5 | *110* | 107.4 | *55* | 88.9 | *2* | 16.8 | *106* | 15.7 | *16* | –0.04 |
| 61 | Benin | 41.2 | *111* | 107.5 | *52* | 87.5 | *3* | 29.4 | *80* | 6.3 | *64* | –0.06 |
| 62 | Korea, Repu | 90.5 | *61* | 109.5 | *16* | 52.0 | *55* | 36.0 | *63* | 1.0 | *104* | –0.07 |
| 63 | Ecuador | 97.0 | *43* | 106.6 | *71* | 24.2 | *101* | 42.9 | *35* | 5.2 | *75* | –0.08 |
| 64 | Paraguay | 95.0 | *51* | 106.6 | *72* | 26.1 | *98* | 43.2 | *34* | 5.6 | *70* | –0.09 |
| 65 | Greece | 92.2 | *55* | 107.0 | *61* | 35.2 | *84* | 39.5 | *47* | 5.3 | *74* | –0.11 |
| 66 | Central Africa | 48.4 | *104* | 111.4 | *7* | 79.8 | *14* | 18.0 | *104* | 3.9 | *86* | –0.13 |

Appendix Table

Continued

| | *Country* | *REDUC* | | *RLEXP* | | *REAP* | | *SPTAM* | | *SPAR* | | *SIGE5* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 67 | Guinea-Bissau | 35.6 | *114* | 107.9 | *44* | 65.4 | *27* | 25.6 | *86* | 12.7 | *23* | –0.14 |
| 68 | Burkina Faso | 44.3 | *109* | 107.7 | *48* | 84.3 | *7* | 25.6 | *85* | 5.6 | *69* | –0.15 |
| 69 | Ghana | 53.7 | *101* | 106.8 | *66* | 64.8 | *28* | 33.8 | *68* | 7.5 | *52* | –0.18 |
| 70 | Singapore | 87.2 | *66* | 107.8 | *45* | 49.0 | *58* | 31.9 | *73* | 3.7 | *87* | –0.19 |
| 71 | Myanmar | 86.9 | *67* | 106.2 | *81* | 58.9 | *42* | 37.8 | *56* | 1.8 | *99* | –0.19 |
| 72 | Bolivia | 74.8 | *78* | 108.1 | *39* | 33.7 | *87* | 37.7 | *57* | 7.0 | *58* | –0.24 |
| 73 | Gambia | 48.2 | *106* | 107.7 | *47* | 65.4 | *26* | 25.5 | *87* | 7.8 | *49* | –0.25 |
| 74 | Peru | 86.0 | *68* | 106.5 | *73* | 32.3 | *90* | 36.9 | *58* | 6.4 | *61* | –0.27 |
| 75 | Malawi | 61.2 | *92* | 103.4 | *104* | 68.0 | *23* | 31.6 | *75* | 11.6 | *32* | –0.29 |
| 76 | Iraq | 78.0 | *74* | 104.7 | *98* | 28.5 | *92* | 42.6 | *37* | 10.8 | *35* | –0.30 |
| 77 | Fiji | 95.6 | *49* | 106.1 | *83* | 25.5 | *100* | 35.5 | *65* | 3.9 | *85* | –0.30 |
| 78 | Malta | 99.3 | *33* | 106.2 | *78* | 27.9 | *97* | 35.3 | *66* | 1.5 | *103* | –0.30 |
| 79 | Brazil | 96.9 | *45* | 108.5 | *35* | 37.6 | *77* | 13.6 | *113* | 5.5 | *71* | –0.31 |
| 80 | Malaysia | 84.2 | *69* | 106.0 | *85* | 54.8 | *46* | 20.5 | *101* | 7.6 | *50* | –0.35 |
| 81 | Cape Verde | 78.4 | *73* | 103.1 | *105* | 36.5 | *80* | 46.2 | *23* | 7.6 | *51* | –0.35 |
| 82 | Guatemala | 77.6 | *75* | 107.9 | *43* | 20.0 | *106* | 40.9 | *44* | 5.2 | *76* | –0.35 |
| 83 | Cameroon | 72.8 | *80* | 105.8 | *90* | 48.7 | *60* | 22.2 | *96* | 12.2 | *28* | –0.39 |
| 84 | Equatorial | 64.6 | *87* | 107.2 | *58* | 64.3 | *31* | 25.0 | *91* | 3.3 | *90* | –0.41 |
| 85 | Turkey | 75.9 | *76* | 108.3 | *37* | 53.6 | *49* | 23.7 | *93* | 1.8 | *100* | –0.46 |
| 86 | Togo | 46.0 | *107* | 106.9 | *65* | 55.9 | *43* | 20.7 | *100* | 6.3 | *63* | –0.51 |
| 87 | Senegal | 55.4 | *100* | 104.3 | *100* | 63.5 | *32* | 15.8 | *109* | 11.7 | *31* | –0.55 |
| 88 | Lebanon | 79.2 | *72* | 106.0 | *86* | 36.3 | *81* | 31.9 | *74* | 2.3 | *95* | –0.57 |
| 89 | Zambia | 75.7 | *77* | 103.8 | *103* | 40.4 | *72* | 29.7 | *79* | 6.7 | *60* | –0.59 |
| 90 | Nigeria | 58.6 | *96* | 107.0 | *62* | 52.3 | *53* | 25.4 | *89* | 2.1 | *98* | –0.60 |
| 91 | Zaire | 56.2 | *98* | 106.9 | *64* | 53.7 | *48* | 16.1 | *107* | 5.4 | *72* | –0.62 |
| 92 | Cote d'Ivoire | 57.6 | *97* | 106.7 | *69* | 53.8 | *47* | 14.2 | *112* | 4.6 | *82* | –0.69 |
| 93 | Solomon Islands | 68.2 | *82* | 106.0 | *87* | 61.4 | *37* | 25.1 | *90* | 0.0 | *110* | –0.76 |
| 94 | Ethiopia | 59.2 | *95* | 107.4 | *54* | 59.0 | *41* | 22.7 | *94* | 0.0 | *111* | –0.77 |
| 95 | Liberia | 41.0 | *112* | 103.9 | *102* | 42.6 | *69* | 22.7 | *95* | 6.8 | *59* | –0.79 |
| 96 | Kuwait | 90.9 | *59* | 105.1 | *94* | 23.5 | *102* | 34.0 | *67* | 0.0 | *108* | –0.79 |
| 97 | Jordan | 89.2 | *63* | 105.7 | *92* | 12.1 | *111* | 30.4 | *78* | 0.8 | *106* | –0.80 |
| 98 | Djibouti | 56.1 | *99* | 107.0 | *63* | 68.6 | *20* | 17.4 | *105* | 0.0 | *115* | –0.80 |
| 99 | Sudan | 50.5 | *102* | 104.9 | *96* | 28.2 | *95* | 27.3 | *82* | 4.6 | *79* | –0.83 |

Appendix Table

Continued

| | *Country* | *REDUC* | | *RLEXP* | | *REAP* | | *SPTAM* | | *SPAR* | | *SIGE5* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 100 | United Arab Emirates | 97.7 | *41* | 106.3 | *76* | 14.0 | *110* | 21.4 | *97* | 0.0 | *112* | –0.87 |
| 101 | Papua New Guinea | 67.7 | *83* | 102.7 | *107* | 68.1 | *22* | 25.4 | *88* | 0.0 | *109* | –0.91 |
| 102 | Syrian Arab Rep. | 61.7 | *91* | 105.9 | *89* | 21.4 | *105* | 12.9 | *114* | 8.4 | *47* | –0.93 |
| 103 | Algeria | 65.6 | *85* | 103.1 | *106* | 10.6 | *113* | 25.7 | *84* | 10.0 | *40* | –0.94 |
| 104 | Mali | 48.2 | *105* | 107.6 | *50* | 18.3 | *107* | 19.0 | *103* | 2.3 | *96* | –0.98 |
| 105 | Comoros | 74.4 | *79* | 101.9 | *110* | 66.6 | *25* | 20.9 | *99* | 0.0 | *113* | –1.01 |
| 106 | Nepal | 35.6 | *113* | 97.6 | *115* | 53.5 | *50* | 36.0 | *62* | 2.6 | *94* | –1.03 |
| 107 | Morocco | 49.9 | *103* | 105.8 | *91* | 26.1 | *99* | 24.7 | *92* | 0.7 | *107* | –1.04 |
| 108 | Iran | 70.7 | *81* | 100.8 | *111* | 22.9 | *104* | 31.4 | *76* | 3.5 | *89* | –1.05 |
| 109 | Egypt | 64.3 | *88* | 104.2 | *101* | 11.5 | *112* | 27.2 | *83* | 2.2 | *97* | –1.09 |
| 110 | Mauritania | 59.5 | *94* | 107.3 | *57* | 27.9 | *96* | 19.7 | *102* | 0.0 | *114* | –1.10 |
| 111 | India | 63.8 | *90* | 100.2 | *112* | 36.0 | *82* | 15.9 | *108* | 7.3 | *54* | –1.13 |
| 112 | Tunisia | 63.9 | *89* | 102.4 | *108* | 32.7 | *89* | 14.3 | *111* | 4.3 | *84* | –1.14 |
| 113 | Bangladesh | 60.4 | *93* | 98.6 | *114* | 8.4 | *115* | 21.4 | *98* | 10.3 | *36* | –1.34 |
| 114 | Afghanistan | 27.7 | *115* | 102.4 | *109* | 9.9 | *114* | 12.5 | *115* | 1.7 | *101* | –1.54 |
| 115 | Pakistan | 45.7 | *108* | 100.0 | *113* | 15.4 | *109* | 15.8 | *110* | 1.0 | *105* | –1.63 |

## NOTES

1. Income is "adjusted" to the effect that higher incomes are discounted. The idea is that the higher the income level, the lower is the contribution of additional income to well being. See also note 3.
2. HDI includes tertiary education in this enrolment figure.
3. The calculation of the income component of the GDI and the HDI has also undergone another change between 1998 and 1999: UNDP no longer uses the Atkinson method to adjust per capita incomes, but instead natural logarithms of per capita incomes which are then indexed. Following the Atkinson method, indexing for the GDI was done as a final step, after multiplying adjusted incomes with the population-weighted harmonic mean of the proportional income shares. In order to be able to analyze the effect of the Bardhan and Klasen change only, I use logarithms for both cases.
4. They propose two further alternatives; one solves the problem of the unequal punishing of inequality at different GDP per capita, and the other excludes

the problematic income component alltogether. However, the alternatives are still no measure of gender inequality as such.

5. See, Wieringa (1997a). The Workshop was held at the Institute of Social Studies and was financed by the Directorate General for International Cooperation (DGIS) of the Dutch Ministry of Foreign Affairs. The countries of origin of the participants included Bhutan, Benin, Costa Rica, the Netherlands, the United Kingdom and Viet Nam. The country choice is partly related to the Agreements on Sustainable Development that the Dutch government has concluded with Benin, Bhutan and Costa Rica.
6. For education, the power was 5 and for share in parliament, the power was 0.5.
7. Reverse order is needed because the number of countries listed is not the same for SIGE, GDI and GEM.

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