SOCIAL ECONOMICS, POLICY AND DEVELOPMENT

Working Paper No. 3

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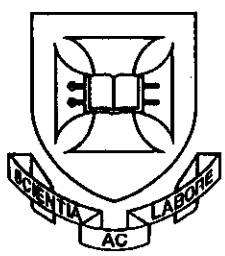

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GENDER INEQUALITY, DEVELOPMENT AND UNDP'S SOCIAL VALUATION INDICES: HDI,GDI AND GEM WITH PARTICULAR REFERENCE TO INDIA

But as to women, who can penetrate the real sufferings of their she condition? Man's very sympathy with their estate has much of selfishness and more suspicion. Their love, their virtue, beauty, education, but form good housekeepers, to breed a nation - Lord Byron

Abstract

This paper analyses the different indices applied for the measurement of human development as constructed by the United Nations Development Program. Of special interest is the Gender Development Index (GDI), introduced in the 1995 Human Development Report and the Gender Empowerment Measure (GEM). In light of the male bias in the Indian socio-economic context, the application of the GDI and GEM acquires special significance. A critical appraisal of their theoretical base and their application has been undertaken in this paper. The conclusion is that GDI and GEM although praise-worthy achievements on the part of the UNDP, do not adequately reflector or measure male/female disparity in the Indian context. Both indices suffer from the weakness of employing a pre-assigned value of the Gender Sensitive Equity Indicator. They also exhibit several other shortcomings, outlined here. GDI is a poor indicator of the relative deprivation of females as shown by our analysis of the relationship between the GDI and the female/male ratio for 16 Indian core states.

Introduction

The Gender Empowerment Committee established in 1997, came up with their first draft report of women in poverty in India in April 1999. It portrays an abysmal picture of the penury of the Indian women. The ineffectiveness of poverty alleviation programs in India to reduce the poverty of the Indian women highlights the fact that the different indices as proposed by the UNDP fail to take account of the economic welfare of women and capture the real situation. The difference between the rural poor and the urban poor women, the educated and the uneducated, the poor and the extremely poor can not be captured by a single index. In a country like India, where one of the strongest Prime ministerial candidate is a woman (Sonia Gandhi), where the chief minister of the most backward state is a woman (Bihar, Ravri Devi), and where the Indian parliament was dissolved by the political power of another woman (Jaylalita), one wonders how women can suffer so much.

There is now widespread official use of indicators and indices of poverty and of development. The earliest indicators and indices were relatively crude. For example, percentage of population below the poverty line, level of GDP per capita, HDI. Even though the Human Development Index (HDI) was in many respects a superior indicator of economic welfare than GDP per capita, it provided no indication of the distribution of HDI regionally, between rural and urban populations and according to gender, and other

social characteristics. It is possible for GDP per capita and HDI to increase and for such inequalities to grow.

The Gender Development Index (GDI) attempts to at least take account of changes in gender inequality but it does not go much further than this - it does not for example incorporate information about changes in GDI regionally. In a large country such as India, GDI could for example increase but this could be consistent with rising GDI in the south India and falling GDI in the north. There is in fact evidence that the status of women in north India has actually deteriorated with rising incomes and indicated by changing male/female ratios in its population (Agnihotri et.al., 1998). However, this problem could be overcome by calculation of state-wise or region-wise GDI. Nevertheless, GDI can increase and the percentage of women living in poverty can do so simultaneously.

Furthermore, while estimates of rural and urban poverty are usually available, it is more difficult to find indicators which provide information on the economic status of rural women compared to urban women.

Although aggregative national measures of poverty, development indices and the economic status of females have some value from a policy point of view, they need to be supplemented by regional studies and those of identifiable social groups (e.g. tribal groups and caste-related groups in India) as well as micro-type field studies. This is

necessary to identify the presence of poverty, the factors which influence its occurrence and to target measures to alleviate poverty and address gender inequalities effectively.

A theoretical review

The entitlement or capability approach introduced by Sen (1981) formed the basis of Human Development Report (UNDP,1990). The Human Development Index (HDI) was introduced in the first Human Development Report (UNDP,1990). The GNP approach for indicating economic welfare was very crude although it took into account some economic aspects of development. Various socio-economic indicators of development were missing. One could not tell for sure whether an increase in per capita income was also associated with increased longevity, higher literacy or a higher purchasing power.

Poverty has been subjected to much empirical research and debate. Definitions of poverty nowadays vary widely. The poverty pyramid as described by Baulch (1996) provides an overview of concepts ranging from that of the World Bank to that of the UNDP. The World Bank's definition of poverty is solely based on a personal consumption measure, whereas UNDP takes into account personal consumption, common property resources, state provided commodities, assets, dignity and autonomy. The definition of poverty used by the UNDP (1997) is distinct from that of income poverty, which refers to the denial of economic opportunities and choices for living a most basic or tolerable human life.

Human poverty and income poverty are not the same thing, although they are interrelated. Measurement of income poverty focuses on the levels of absolute income poverty, while HDI focuses on capabilities such as healthiness and the level of literacy. The World Summit for Social Development (1995) report notes that one third of people in developing countries continue to live in "income poverty", earning less than $1 per day. However, the report emphasizes the importance of looking beyond income to address human poverty by considering lack of essential human capabilities such as being healthy and adequately nourished. However, GDI takes no account of female poverty as such.

The wider concept of human development includes widening "people's choice" as well as the level of their "achieved well being". While the core of human development consists of a long and healthy life, to be educated and enjoy a decent standard of living, additional factors include political freedom, guaranteed human rights and self-respect. The human development approach distinguishes between the formation of human capabilities and the use of those acquired capabilities for work or leisure. It is important to note that the concept of human development is different from the concept of economic growth, theories of human capital formation and human resources development, the human welfare approach and the basic needs approach.

The core of the human development approach constitutes the basis for HDI, which involves a weighting of three variables — a linear combination of life expectancy, educational attainment and income put together in an index to rank different countries. In

this index combination of adult literacy (two thirds weight) and mean years of schooling (one third weight) measure educational attainment. Income, which reflects the standard of living is measured by purchasing power, based on real GDP per capita adjusted for the local cost of living (Purchasing Power Parity, or PPP).

Limitations of HDI

The HDI applies fixed weights to each of its main variables. Thus, it is a linear social valuation (or social utility) function with three 'independent' variables. Clearly these weights involve value judgements and it is doubtful whether the chosen weights (equal weights or a weight of one-third to each of its components) is appropriate. How much weight should be placed on each of educational attainment, length of life and real GDP per capita?

Again it seems likely that these three variables are not independent variables. For example, length of life is likely to rise both with GDP per capita and educational attainment. In turn, educational attainment normally rises with GDP per capita.

Furthermore, the linearity of HDI implies a constant rate of indifferent substitution between the 'independent' attributes. It implies that they are perfect substitutes. This suggests for instance that society would be prepared to accept a reduction in the average

length of life for increased educational attainment at a constant rate of trade-off. However, this seems implausible.

In addition, it can be argued that HDI is too restrictive in the attributes which it takes into account in assessing 'welfare'. It does not for example take account of factors such as security of income and employment and 'psychological well-being'. For example, although HDI is high in some countries, so are stress levels and rates of suicide. As pointed out by Weckstein (1962), the well-being of individuals does not merely depend on their levels of actual real income, but also on differences between actual income and that aspired to. While all complexities cannot be allowed for in a crude measure of social welfare, we should at least be cognizant of its major limitations.

Another drawback of HDI is its failure to consider the distributional aspect of its variables. The aggregate indicators of life expectancy, literacy and income use a simple arithmetic mean of achievement or shortfall over the entire population. This process of averaging ignores the systematic large differences between divergent groups of people. For example differences between rural and urban poor, men and women, people living in metropoli rather than in small towns, and even people in different metropoli. The scope for employment and income varies greatly between Calcutta and Delhi or Mumbai. Apart from these differences there are disparities between different classes, racial groups, and minorities. Sen's theory of endowment and entitlement exchange (Sen, 1981), points out this fact quite strongly, e.g. a graduate living in a small town or village and a graduate

living in a metropoli have different exchange entitlement in spite of the fact their endowment factors, which in this case is education, is same.

Although UNDP's Human Development Report (HDR), was from its very beginning concerned with women's economic status, the first reflection of it was seen in HDR 1995 which introduced the Gender Development Index (GDI). The GDI made use of the Gender-Equity-Sensitivity-Indicator (GESI). The concept of GESI is based on equality or inequality between men and women. GESI is the basis for both GDI and Gender Empowerment Measure (GEM).

New initiatives in the HDR were based on a three-point agenda, as pointed out Anand and Sen (1995): Development of GESI, formulation and application of measures of gender equality, and inequality and recognition of women's contribution in national income and employment statistics. All three have turned out to be extremely important for women's welfare, but this paper limits itself to discussion of indices only.

Gender Development Index (GDI)

The Gender Related Development Index involves a variation on HDI. It incorporates a measure of gender equity into a measure of absolute levels of human development. The GDI methodology imposes a penalty for inequality, that is GDI falls when the disparity between the achievements of men and women increase. GDI is simply HDI adjusted for gender inequality. It reflects disparities between gender in health education and income.

Therefore, the greater is the gender disparity in aggregate capabilities the lower will be a country's GDI compared with its HDI.

According to the UNDP (1995), each society can select a specific value for its "aversion to gender inequality" (ε), depending upon the its initial position and the time-bound goals it sets for itself. If there is no aversion to inequality, this implies that the value of ε is zero. When ε is zero, there is no difference between the HDI and GDI. The higher the aversion to gender equality the larger is the value of ε for the weighting procedure.

Technical notes 1 and 2 contained in HDR 1995 discuss the theoretical and mathematical considerations underlying the methodology for computing gender equity-sensitive indicators. The computation of the GDI requires calculation of

(1) The equally distributed index of life expectancy.
(2) The equally distributed index of educational attainment.
(3) The equally distributed index of income.

The GDI is an average of the above three and has a value ranging from zero to one. For the calculation of the equally adjusted indices, the HDR suggests using a weighting formula that expresses a moderate aversion of inequality, setting the weighting version for ε equal to 2. This is the harmonic mean of male and female values, and is calculated by taking the reciprocal of the population-weighted arithmetic mean of the female and male achievement levels, which themselves are expressed in reciprocal forms. The

harmonic mean will be less than the arithmetic mean to the degree that there is disparity between female and male achievements.

Equally distributed index of life expectancy

To calculate the value of GDI, 1995 HDR (1995) suggests the same range in the difference of years of life expectancy between minimum and maximum for both men and women, namely 60 years. But the minimum and maximum values differ from men to women taking the biological factor of higher life expectancy for women into consideration. The minimum life expectancy for women is taken as 27.5 years and for men as 22.5 years. The maximum life expectancy is assumed to be 87.5 years and 82.5 years respectively for females and males.

Equally distributed index of educational attainment

The poor quality and non-availability of appropriate data has always posed serious problems for assessing educational attainments. HDR 1990 proposed using adult literacy rates as a measure of educational attainment. The inability of adult literacy rate to truly capture and distinguish between educational attainments, especially in less developed countries, led to the modification of this component. In 1991, the index of educational attainment included both adult literacy rates and the mean years of schooling. In 1995, there was a change because of the problem of data inconsistency for measuring

educational attainment. Since 1995, the variables for educational attainment are a combination of adult literacy with a two-third weight, and gross combined primary, secondary and tertiary enrolment, with one-third weight. Each of these sub-components is indexed separately. Both indices use a minimum value of zero percent and a maximum value of 100 percent. The two indices are added together using the appropriate weights to form the composite index of educational attainment.

Equally distributed index of income

The HDI uses an adjusted measure of real GDP per capita expressed in purchasing power parity dollars as a surrogate to measure command over resources needed for a decent standard of living. The HDI adjusts real income (expressed in PPP dollars) for the diminishing utility of higher levels of income to human development. The HDI uses as a threshold for income which is the average global real GDP per capita in PPP dollars. The HDI treats income up to this level at full value, but sharply discounts incomes above this level as having a diminishing utility by using the following formula:

$W(y) = y^*$ for $0<y<y^*$

$= y^* + 2\,[(y-y^*)^{1/2}]$ for $y^* \leq y \leq 2y^*$

$= y^* + 2\,(y^{*1/2}) + 3\,[(y-2y^*)^{1/3}]$ for

$2y^* \leq y \leq 3y^*$

India's real GDP per capita for 1998 was estimated at PPP level $1660, which is well below the threshold level of PPP$5448 for 1998, and therefore does not require any adjustment. The impact of this discounting of higher income is to reduce the apparent disparity between high income and low income countries.

The computation of the equally distributed income requires the calculation of the female and male shares of earned income:

This is done by calculating:

(1) the ratio of the average female wage to the average male wage

(2) the female and male percentage shares of the economically active population aged 15 and above. This ratio is assumed to be the average ratio of the agricultural sector too.

Gender Empowerment Measure (GEM)

Measuring empowerment of women can be performed in numerous ways. The decision to use the Gender Empowerment Measure (GEM) based on limited data was influenced by the lack of ready availability of data Most countries do not provide enough data to allow significant international comparison. The measurement of Gender Empowerment could be extended if more data were available.

As a measure of gender income inequality, these indicators (GDI and GEM) are far from satisfactory although they may be the best that can be achieved with the available data. They focus on sources of income rather than the users of income. For example, a female may earn cash income but it may be mainly used by her husband. Studies of income distribution and power relationships within the family are essential for determining which family members control and utilize family income. This limitation is also noted by UNDP (1995, p. 131) which comments: 'Although we have tried to estimate these earning figures for women and men, it must be noted that they need not reflect the use that women and men can make of these resources because the resources are pooled for joint use of the family'. Further limitations are discussed later.

Like the GDI, the GEM is also calculated in three steps

(1) Calculation of indices for parliamentary representation and administrative, managerial, professional and technical position

(2) Calculation of an index for gender relation shares of earned income

(3) Computation of the gender empowerment measure

The first two steps involved several of sub-steps.

The GEM is an indicator of the empowerment of women in political and economic activity. The first cluster of variables that are chosen for this calculation are occupational ones. In the first phase, indices for parliamentary representation and administrative,

managerial, professional and technical positions are calculated by their percentage share. This is done to provide an estimate of economic participation and decision-making power. The four sections of calculation are very loosely defined occupational categories, as the relevant population for each is different.

In the second phase of the first step of the GEM calculation an Equally Distributed Equivalent Percentage (EDEP) is estimated for both sexes taken together. This is also calculated in the same four groups as mentioned earlier.

For each occupational category, the population weighted (1-ε) averaging of the GESI methodology is used to derive an equally distributed equivalent percentage (EDEP) for both sexes taken together.

The value of ε is assumed to be equal when calculating the GDI and GEM of the same country. The EDEP is socially valued as the actual unequal percentage of men and women, given society's aversion to inequality. If there is perfect equality between men and women the EDEP equals 50%. The greater the disparity between female and male shares, the lower the EDEP becomes, that is lower relative to 50%. Therefore, for indexing purposes 50% is maximum and 0% is minimum. Once indexing has been done, the two categories of occupations are added together, each given equal weight.

The second variable in GEM reflects political participation and decision making powers. It takes account of female and male percentage shares of parliamentary seats. (1-ε)

averaging of those two shares is done to derive the EDEP, and then is indexed. As before the maximum value is 50% and the minimum value becomes 0%.

The variable chosen to reflect power over economic resources is unadjusted real GDP per capita with a range from $100 to $40,000 (Unlike the calculation of HDI and GDI which use PPP). The same procedure, as in GDI, for calculation of proportional income shares of women and men are followed to derive an equally distributed proportional income share through (1-ε) averaging, and then discounting the average unadjusted real GDP per capita of each country by the degree to which the latter ratio is less than 1. If there is equality between women and men, this ratio would be 1 and average unadjusted income would not be discounted.

In the final step, all the indices for each of he three clusters of variable are added and divided by 3, which gives the overall GEM for a country.

Limitations of Gender Equity Sensitive indicators

Gender sensitive indicators are calculated with a weighting formula, which usually expresses a moderate aversion to gender inequality and is called ε. ε is called the extent

of inequality aversion and is a measurement of GESI. In the case when $\varepsilon = 0$, the simple arithmetic average of the variables is used, which means there is no concern for equality and the arithmetic mean indicates the social achievement. But when $\varepsilon>0$ there is a social preference for equality, or an aversion to social inequality which is measured by the magnitude of the parameter ε.

If one assumes that female achievement fall shorts of male achievement, $(1-\varepsilon)$ averaging provides a number of options. As mentioned earlier, a value $\varepsilon = 0$ provides an option of arithmetic average, a value of $\varepsilon = 1$ provides a geometric average and a value of $\varepsilon = 2$ provides a harmonic mean. ε can vary from 0 to ∞. Mathematically speaking, if $\varepsilon \rightarrow \infty$, then social achievement across countries will be measured by female achievement alone.

One can have different values of GDI and GEM depending on the values of ε; a moderate aversion of inequality is reflected in the value of $\varepsilon = 2$, which selects the harmonic mean. The harmonic mean is calculated by taking the reciprocal of the population-weighted arithmetic mean of the female and male achievement levels, which are also expressed in reciprocal forms. It is important to note that harmonic mean will be less than the arithmetic mean when there is disparity between female and male achievement.

However, there is no positive way of quantifying aversion to inequality. The choice of ε-value involves a normative judgement. UNDP (1995, p.126) technical note, suggests that ε can be allowed to vary between countries to reflect the differences in equity

performances between countries. Not only can values of ε be different from country to country, but may vary by regions, for example in India.

The value of ε = 2, has been widely used to calculate the gender based indices as it reflects the harmonic mean, which is often considered to be a better measure than arithmetic and geometric mean in those cases. The value of ε will perhaps differ from caste or tribe, between Santhals to Mizos and from poor to extremely poor, from the rural to the urban sector, and by different regions.

For example Shiva Kumar (1996) calculates GDI for different Indian states, based on moderate aversion of inequality. The weakness of the study lies in the fact, that value of ε was assigned first, which was 2 in this case, a moderate version of inequality for all the states analyzed and then provided with GDI ranking. This study fails to consider likely differences in GESI between regions in India and how such diversity is best accounted for.

The weakness of the indices, GDI and GEM, lie in the use of the Gender Sensitive Equity Indicator; ε, as it is not calculated — it is selected. It is a pre-assigned value determined by the person (s) undertaking the estimation. Because inequality aversion will differ in different sections of a country, in different groups of people, the pre-assigning of a notional value to the sensitive indicator will never reflect the full picture in a country.

Apart from limitations of GESI already discussed, there are other factors which limit the application of GDI and GEM. The inequality correction to HDI needed to estimate GDI involves the estimation of inequality-corrected achievements in terms of different focus variables. There is a high probability that these different variables might work in opposite directions, moderating the influence of each other on the allowance for inequality between individuals.

There are also other major limitations of GDI and GEM. One of the main difficulties is that their purpose is unclear. Are they seriously intended as social valuation functions? If so, are they to be used for international comparisons and examination of historical trends? In that case is it reasonable to allow the Gender Sensitive Equality Index, ε, to vary? To do so allows for an 'elastic ruler'. Or is the purpose of such measures to provide a spur to policy development to assist greater gender equality when unfavorable values of GEM and GDI are observed?

In the latter respect, because these indices, like HDI, are aggregate measures, they may conceal significant gender inequalities. It is for example, possible for gross inequality between females to increase and for GDI and GEM to remain constant, other things equal. This is because gender inequality only relates to the *average* situation of males compared to the *average* for females. Thus in the case of India, female inequality regionally, e.g., between its north and its south, between tribes and non-tribals, between urban and rural areas may rise considerably without this being reflected in any change in either GDI or GEM. Because of this insensitivity, important social policy matters can

easily be overlooked. For a practical point of view, it is important to at least supplement GDI and GEM measures by disaggregated gender related studies.

A major difficulty with both GEM and GDI is that no convincing guidance is given to how the value of ε, the Gender Sensitive Equality Indicator, is best chosen, and whether any systematic restrictions in ε are to be expected between countries and with the passage of time. For example is it to be expected that ε will be larger the more developed is a country?

Neither GDI nor GEM reflect very well the entitlements of females, especially in non-market exchange situations. They are biased towards market exchange measures. But within the family most exchange is of a non-market character. Furthermore, in less developed countries, much production does not enter market exchange. The subsistence and semi-subsistence sector is poorly allowed for. While market exchange entitlements obtain much coverage, non-market entitlements do not and endowments including rights to assets receive no attention. Thus, these measures do not provide an adequate representation of the entitlement and endowments approach introduced by Sen (1981), if Sen's approach is generously interpreted. To some extent this is surprising given that Sen himself was involved in the development of the theoretical bases of GDI and GEM.

Possibly such shortcomings can only be explained by Sen's desire to tailor the measures to the availability of data. But measuring 'at all costs' can be a dangerous exercise

especially so when the exercise is driven by political considerations as may have been so in UNDP's case. Certainly from a social policy point of view much more than aggregate indices are needed to target the alleviation of economic disadvantage.

Furthermore, it would be very useful to have an indicator of comparative male and female poverty. None of the above mentioned indices take account of poverty as such. While it has to be recognized that data availability restricts the range of gender sensitive indices which can be calculated, calculation for calculation's sake is of little value. In fact, estimation of inadequate gender sensitive indices can do more harm than good or be a waste of scarce resources. One should not be driven by political considerations to compile such indices at all costs.

A brief comparison of Indian indices with those of other countries indices in the Region

Table 1 provides a comparison of development and similar indices for India and similar countries in its region. The six indices provided in this table have been discussed in the paper. Myanmar, Nepal and Bhutan do not have GEM rankings due to lack of data. The different indices have been calculated and ranked based on 1995 data It is quite evident from the table that India does not fare well in any of the indices. According to HDI, India's ranking is below 138 other countries, which is one rank lower than it was in 1997.

TABLE 1

COMPARISON OF DEVELOPMENT AND SIMILAR INDICES AMONGST SAARC COUNTRIES, CHINA AND MYANMAR FOR 1995

Country	HDI Ranking	GDI Ranking	GEM Ranking	Life Expectancy Index	Educational Index	GDP Index
Sri Lanka	90	70	84	0.79	0.83	0.53
Maldives	95	77	76	0.64	0.86	0.55
China	106	93	33	0.74	0.76	0.46
Myanmar	131	120	n.a.	0.57	0.71	0.17
Pakistan	138	131	100	0.63	0.39	0.34
India	**139**	**128**	**95**	**0.61**	**0.53**	**0.21**
Bangladesh	147	140	80	0.53	0.38	0.21
Nepal	152	148	n.a.	0.52	0.37	0.17
Bhutan	155	147	n.a.	0.45	0.39	0.21

Source: Based on UNDP: Human Development Report, 1998.

In terms of GDI, India's relative position has worsened a lot. Its 1998 rank of 128 is ten notches below that of 1997. According to GEM ranking India's performance has slipped by 9 ranks compared to 1997, i.e. from 86 in 1997 to 95 in 1998. This is consistent with the observation of Tisdell et al. (1999) that despite economic growth in India deprivation of females appears to be increasing, particularly in North India.

However, the Life Expectancy Index has gone up by .02 percent, that is from 0.61 in 1997 to 0.63 in 1998. The Education Index and GDP index has remained the same at 0.53 in and 0.21 in1997 and 1998 respectively.

GDI is a poor indicator of female deprivation in India

Nevertheless as suggested earlier, GDI is a weak indicator of female deprivation. It fails for example to take account of the magnitude of poverty amongst females compared to that of males. It is a possible that the female/male ratio (FMR) provides a superior

indicator of the relative deprivation of women. In the absence of discrimination against females, one expects the FMR to be unity or somewhat greater than unity. In India in virtually all states FMR is less than unity, often substantially less so (see Table 2). Low female/male ratios indicate the likelihood of female foeticide and infanticide and deprivation of female which results in their early death than would be so with equal treatment with males. Kerala is the only Indian state with a FMR in excess of unity. FMRs tend to be higher in north India as mentioned in Tisdell et al. (1999) and as observed by Dyson and Moore (1983) and Agnihotri et al. (1998).

TABLE 2

GDI VALUES AND FMRS FOR 16 CORE STATES OF INDIA FOR 1991 WITH RANKS IN BRACKETS.

STATE	FMR	GDI
Andhra Pradesh	0.927 (9)	0.371 (9)
Assam	0.923 (10)	0.347 (11)
Bihar	0.912 (11)	0.306 (15)
Gujrat	0.934 (6)	0.437 (3)
Haryana	0.865 (16)	0.37 (10)
Himachal Pradesh	0.976 (2)	0.432 (4)
Karnataka	0.96 (5)	0.417 (6)
Kerala	1.036 (1)	0.565 (1)
Madhya Pradesh	0.93 (8)	0.312 (13)
Maharashtra	0.934 (6)	0.492 (2)
Orissa	0.972 (3)	0.329 (12)
Punjab	0.883 (13)	0.424 (5)
Rajasthan	0.908 (12)	0.309 (14)
Tamil Nadu	0.972 (3)	0.402 (7)
Uttar Pradesh	0.879 (14)	0.293 (16)
West Bengal	0.869 (15)	0.399 (8)

Source: GDI values for 1991-92 as per Kumar (1996), Table 5. FMRs for 1991 calculated from Kumar (1996), Table 4 i, based on Indian census data.

Casual examination of Table 2 however indicates that while FMRs tend to be lower in the Indian northern states than in the southern ones, in many cases GDI figures are higher in the north than GDI figures in the south. For example, the disparity between the GDI ranking of the Punjab and its FMR ranking is striking. The obvious disparities suggest that there may not be a close relationship between the values of the GDI for the Indian states.

Statistical analysis of the cross section of observations shown in Table 2 in fact indicates that this is so. Multiplying the ratios in Table 2 by 100 and letting y represent GDI×100 and x represent FMR×100, and fitting a linear regression to the observations by the method of least squares, the linear relationship between the variables is

$$y = -36.85 + 0.81x + u$$

where u is a random error term. While the *t*-statistics for x is 2.24 with a probability of 0.418 and therefore is highly significant, the values of R^2 and adjusted R^2 are only 0.26 and 0.21 respectively. We can conclude that while there is a positive relationship between GDI and FMR, the degree of association or correlation is extremely poor. Thus from Indian data, we can conclude that GDI is likely to be an extremely poor indicator of the relative economic (or social) deprivation of females. If we can have little confidence in its usefulness as a gender inequality indicator within India, we should have doubts of its value for international comparisons.

Concluding comments

The main use of the indicators HDI, GDI and GEM has been to portray a global and macroeconomic scenarios, rather than allow for regional or micro-level differences. The GDI for example provides a picture (but an incomplete one) of female inequality at an aggregative level, whereas GEM, mostly making use of the parliamentary representation ratio, provides an indicator of relative gender empowerment.

Both GDI and GEM to a large extent depend on the GESI, ε, which is not calculated, but determined by the value judgement of the individual undertaking the estimation. But value of ε may be different for every state, every region and every caste and tribe. Since this value can not be calculated, it has to be assigned, and there could be a high probability of misleading results.

Moreover, in calculating GEM, the simple ratio of male to female parliamentarians is taken into account. However, if one of the females is the prime minister or the state head, she should perhaps have more weight. At this point, it is important to keep in mind we are discussing a micro-level analysis rather than macro, and that too in the context of

India. For example Jaylalita, who commands 17 parliamentarians, was responsible for fall of the government certainly carried more weight than any other female parliamentarians at that time. Furthermore, in determining the degree of empowerment of women possibly more of weight has to be given to the degree of representation of female representatives to male at the local government level. A value judgement is required to allow for the degree of political representation of women at different levels of government.

The major problems with the gender-related indices, GDI and GEM are that their purpose and their operational value are unclear. It has been argued above that GDI is deficient as an indicator of economic welfare and gender inequality. Furthermore, GEM is flawed as an indicator of the political and administrative power of females relative to males. In both cases, the high degree of aggregation employed to estimate the indices is a major problem and restricts the policy relevance of the measures. Regional variations, variations by social groups and the rural-urban divide are all ignored in these measures. Furthermore, it is a grave deficiency of GDI that it only concentrates on gender economic imbalance because inequalities of income based on the other social attributes (such as tribal versus non-tribal groups, caste, etc.) may be as important or more important in particular contexts. The serious limitations of GDI and GEM pointed out in this paper suggest that the development of these measures may have been motivated more by 'political correctness' rather than their real worth.

Note

1. Technical Note 1 in *HDR 1995* "Computing Gender-Equity-Sensitive Indicators" is based on Anand and Sen (1995), a background paper prepared for *HDR 1995*, available at http://www.undp.org/hdro/oc19a.htm

2. World Summit for Social Development: Report available at: gopher://gopher.undp.org:70/00/unconfs/wssd/summit/off/a-9.en

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