Gender Inequality in Well-being in India
Estimates from NFHS Household-level Data

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This article proposes to measure functioning-based well-being, as proposed by Amartya Sen and others, for 28 states in India based on National Family Health Survey 3 (2005–06) data. Significant differences between states were found in terms of well-being and wealth indices. Overall, women were found to be far behind men in terms of well-being. The well-being of women was found to decline with age and when they were in larger families, unlike men. While upper-caste women were not found to be doing significantly better than Scheduled Caste and Scheduled Tribe women, upper-caste men were better off. And the women in the northern mountainous regions were found to be doing better than women in the Indo-Gangetic plains. However, the well-being of both men and women was found to be significantly related to the wealth they possessed.

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1 Introduction

Income and material wealth, although necessary, are not sufficient for overall well-being of people particularly in the less developed part of the world. Differences in personal situations, inclinations as well as external circumstances often lead to interpersonal variations in utilising available resources. Thus, social justice along with economic justice is essential for well-being (Sen 1980, 1984, 1985, 1987, 1992, 1999). Amartya Sen's capability approach puts human beings at the centre of development. Sen admits that economic growth and expansion of goods and services are necessary for human development. However, he argues that wealth is not what we are pursuing, it is a means to achieve something else (Sen 1990: 44). It offers opportunities to live a good life, rather than to accumulate resources that matters most for well-being. In the capability approach, underdevelopment is not a deprivation of basic needs, but is a deprivation of basic capabilities or freedoms that would allow an individual to have the kind of life he or she wants.

Well-being is a multidimensional concept. There are many dimensions of well-being that the economic resources are not able to capture. Income, wealth and consumption are crude measures of quality of life because they do not describe fully what people can really achieve with these resources. They cannot clearly portray the reasons behind strong differences and inequalities in standards of living among people with the same income or wealth. Therefore, it is quite evident that the quality of life depends on some factors other than material resources. Health, nutrition, education, social relations, empowerment, etc, constitute the basic elements of well-being. In this study, we assess human well-being in terms of these elements.

An individual's well-being depends on how perfectly he/she is able to perform activities according to his/her wishes; activities, which, in turn raise his/her standard of living. These activities can be called as functionings. The whole set of functionings depends on the capabilities to function, that is, various combinations of beings and doings which the individual can achieve. Obviously, the set of functionings is a subset of the set of capabilities. Capability set indicates the set of opportunities available to the individual to live a better life choosing different combinations of freedom, whereas, functioning set represent the actual combination of activities of the individual which constitute his/her well-being. Capabilities available for the individual and the individual's actual

functionings are significantly related to a person's situation and characteristics, for example, health, gender, the socio-economic and institutional set-up within which the individual lives, and certain conversion factors which influence the individual to convert available resources and personal characteristics into actual well-being, for example, age, position within the family, family size, religion, caste, rural/urban area and agroclimatic area.

Sen's approach has been a remarkable development over the conventional use of gross domestic product (GDP) per capita as a measure of well-being. Thereafter, attempts were made to construct socio-economic indicators as an alternative to GDP per capita as a measure of well-being. The Human Development Index (HDI) (UNDP 1990) was constructed using Sen's approach to make international comparisons of achievements and deprivations of well-being.[1] Following the criticisms on HDI, UNDP corrected its measurements in 1997 and replaced HDI by Human Poverty Index (HPI) with a variant for developing and industrialised countries.[2] Standard of living and quality of life are other two much-used indices for international comparisons of deprivation that use different methods of aggregating and have different theoretical foundations.

Although rankings using HDI-based well-being indices deviate significantly from gross national product-based rankings, they are aggregative measures for international as well as intra-national comparisons of development. All the functioning indicators used to construct these indices are merely aggregative concepts, for example, public expenditure as a percentage of GDP in education and health, number of doctors/physicians in an area, age dependency ratio, net primary school enrolment, teacher–student ratio, percentage of adult literates, percentage of child labour, etc. Aggregative measures are undoubtedly necessary for macro-level policy formulations, but they provide little insight on the well-being of individuals. The capability approach emphasises the interpersonal variation in conversion ability, which results in the inequality of individual-level well-being. Therefore, the ideal study of well-being should be based on individual-level data.

From the second half of the 1990s, a need was felt to measure individual-level well-being using individual-level data in countries like Italy, Chile, etc. Some of the famous studies in this respect were by Balestrino (1996),[3] Laderchi (1997),[4] Martinetti (2000)[5] and Balestrino and Sciclone (2001).[6] In India, Majumder (2007, 2009), for the first time, carried out a multidimensional assessment of well-being of Indian women using the fuzzy sets theory following Martinetti (2000).[7] However, Majumder's analysis concentrated on achievements by women. A comparative analysis of the achievements of men and women and also of different religious and social groups of India is necessary. Ironically, there are very few comprehensive studies in India that use the well-being using capability approach and have gone to the extent of empirical investigation.

This study is an attempt to measure the interpersonal variations in well-being among men and women in India and to identify major explanatory factors behind such variations. It compares the functioning-based well-being of men and women in different states of India. Our study utilises unit-level data from the National Family Health Survey (NFHS-3) for 2005–06. To represent a basic level of human rights endowment that should be guaranteed to all people, we incorporate several functionings to construct our well-being index. We include six functionings for women: being healthy, being educated, being employed, being socially aware, being autonomous, and being safe against domestic violence, and six functionings for men: being healthy, being educated, being employed, being socially aware, being autonomous, and being liberal. In order to build the index of well-being, we have roughly followed the method used by Demographic Health Surveys (DHS) for constructing the wealth index and used the principal component-based factor analysis method. However, since the indicators of well-being index are categorical, we have used the polychoric correlation matrix which is suitable for our factor analysis of categorical variables. We have taken the mean values of male and female well-being indices for all the 28 states of India and ranked them accordingly. We have also ranked the states according to the per capita net state domestic product (NSDP) in 2005–06. We compare the ranking on the basis of well-being indices and NSDP for both men and women. To find out the significant explanatory factors behind variations in well-being indices, we use the ordinary least squares (OLS) regression method, taking the well-being index of an individual as the dependent variable and wealth index of the individual[8] as well as several conversion factors as the independent variables. As conversion factors, we include gender, age, relationship with the head of the household, family-size, religion, caste, rural/urban area, and agroclimatic area.

In the rest of the paper, Section 2 describes the data and the samples used in this study and the methodological issues in the construction of well-being indices of men and women in different states of India. Section 3 deals with the ranking of the states according to the average well-being index as well as according to the per capita NSDP in different states of India in 2005–06 and the comparison between two types of ranking. Methodological issues in estimating well-being equation are discussed in Section 4. Empirical estimates of OLS regression of well-being equation are analysed in Section 5. We present our conclusions in Section 6.

2 Data and Methodology of Well-being Index

The unit-level data from the NFHS-3 for 2005–06 conducted by the Ministry of Health and Family Welfare, Government of India, have been used in this study. The sample consists of 1,94,106 individuals from 28 states of India,[9] out of which 62% are women and remaining 38% are men. NFHS collects a large amount of information on women regarding their background characteristics, reproductive behaviour and intentions, marriage and cohabitation, knowledge and use of contraception, quality of care and contacts with health personnel, antenatal, delivery, and postnatal care, general health, child immunisations, child health, and child feeding practices, women's and children's nutrition, utilisation of Integrated Child Development

Services, status of spousal violence, sexual life, and HIV/AIDS and other sexually-transmitted diseases. While for men, we get information on background characteristics, reproductive behaviour and intentions, knowledge and use of contraception, male involvement in healthcare, sexual life, health and nutrition, and attitude towards gender roles. However, in order to construct the well-being indices for men and women, we have incorporated a basic level of human rights endowments that should be guaranteed to all people. We have selected six basic functionings for men and women separately and constructed six indicator variables which can be used as the proxies of these functionings using the available information in NFHS data.

For Men: Six functionings selected for men are being healthy, being educated, being employed, being socially aware, being autonomous, and being liberal. According to the information collected by NFHS, we have constructed six indicator variables as proxies of these functionings. If the male respondent is not infected by any of the diseases like anaemia, tuberculosis, asthma, diabetes, and thyroid disorders, we have considered him healthy. If he is educated up to at least primary level, he is considered to be educated. Men within any kind of occupation are considered to be employed. We can get the information on whether the male respondent reads newspaper, listens to radio or watches television. If he is in touch with any of these three media, he is considered to be socially aware. NFHS collects information on the male respondent's decision-making power regarding spending his own income, regarding large household purchases, household purchases for daily needs, and regarding his own healthcare. If the man has the final decision-making power in all of the above-mentioned areas or at least enjoys equal power with his wife, we have considered him to be autonomous. NFHS collected information regarding the respondent's mentality about the decision on spending his wife's income. If he thinks that the decision-making power should remain on his wife or be equally shared by both of them, he is considered to be liberal. If he thinks that he alone should decide how to spend his wife's income, he is considered to be non-liberal.

For Women: Six functionings selected for women are being healthy, being educated, being employed, being socially aware, being autonomous and being safe against domestic violence. On the basis of information collected by NFHS, we have constructed six indicator variables as proxies of these six functionings. If the female respondent is not infected by any of the diseases like anaemia, tuberculosis, asthma, diabetes, and thyroid disorders, we have considered her healthy. If she is educated up to at least primary level, she is considered to be educated. Women within any kind of occupation are considered to be employed. However, we have considered female unpaid family workers as unemployed since this type of work does not bring any income for her. NFHS collected the information on whether the female respondent reads newspaper, listens to radio or watches television. If she is in touch with any of these three media, she is considered to be socially aware. We can obtain information about the female respondent's decision-making power over her own income, in matters related to large household purchases and purchases for daily needs and in matters related to her own healthcare. If she has the final decision-making power in all the above-mentioned areas or at least enjoys equal power with her husband, we have considered her to be autonomous. NFHS collected information on domestic violence asking a number of questions related to it. We can get information about whether the husband ever pushed her, shook or threw something at her, slapped her, punched with a fist or something else, kicked or dragged her, tried to strangle or burn her, threatened or attacked her with gun, forced sex or any sexual act on her, twisted her arm or pulled her hair, whether she has ever been physically hurt by mother or step-mother, by father or step-father, by her daughter or son, by her sister or brother, by other relatives, by her mother-in-law, by her father-in-law and by any other in-law. If the female respondent says no to all these questions, we consider her to be safe against domestic violence, whereas, if she responds with a yes to any one question, she is considered to be unsafe.

Data Techniques: After the selection of indicator variables, we merge them into an overall index. We select factor analysis as an appropriate method in order to combine the indicator variables and construct the well-being index. Schokkaert and Ootegem (1990), Lovell et al (1994), Delhausse (1995), Nolan and Whelan (1996) and Balestrino and Sciclone (2001) have used factor analysis as an instrument of construction of well-being index in their studies. Sen (1990) also trusted factor analysis as a suitable instrument for operationalising his approach. DHS uses the Statistical Package for the Social Sciences (SPSS) factor analysis procedure to construct wealth index. We have followed roughly the same procedure. However, we have used STATA 12 to perform our factor analysis.

An important task of any multivariate analysis is to reduce the dimensionality of the data. The method of factor analysis is widely used as an exploratory tool for this purpose. After reducing the dimensionality of the data, factor analysis can further be used to construct a composite index from a set of indicator variables. We use factor analysis in our study in order to compute our well-being index. Assigning the same weight or any arbitrary weight for all the variables is a weak concept. We have to use a specific weight to each of the variable according to its importance in overall well-being. Therefore, our task is to define specific weights for each of the indicator variable and sum them up to construct the well-being index.

The details of factor analysis are shown in the Appendix (pp 49-50).

3 Comparing Well-being- and Income-based Ranking

For each of the 28 states, we construct well-being indices of all the men and women in our sample. In order to compare the average state of well-being of men and women among the

states, we compute average values of well-being indices for men and women for each state separately and rank them according to the values. Table 1 displays the values of average well-being indices of men and women in 28 states of India during 2005–06. The figures displayed in Table 1 suggest that women are far behind men in terms of well-being in all the states of India and the difference between male and female well-being is extremely high in some economically developed states like Delhi, Gujarat, Haryana, Kerala and Rajasthan as well as in some economically backward states like Bihar, Manipur, Madhya Pradesh, Mizoram, and Nagaland and also in a politically disturbed state like Jammu and Kashmir. Difference is lower in the states like Himachal Pradesh, Meghalaya, Maharashtra, Punjab, Sikkim, Tamil Nadu, Tripura, Uttaranchal (now Uttarakhand) and West Bengal. Here we have only compared the average value of male well-being index with that of female well-being index. The average value of well-being index has the general limitation of any average. Being a value of central tendency it does not give us any idea about the whole series. Therefore, in order to find out the internal variation within each series, we have calculated the coefficient of variation (CV) between individual well-being indices for men and women separately for each of the states. The CV of male well-being indices has been found to be much lower than that of female well-being indices. States with extremely low average female well-being indices have been found to have high values of CV. This implies that in almost all the states, men had roughly same level of well-being, whereas level of well-being was hugely diversified among women. Table 1 also shows the values of CV for average male and female well-being indices for all the states.

Table 1: Average Male and Female Well-being Indices in States of India during 2005–06

State	Average Male Well-being Index	CV	Average Female Well-being Index	CV
Andhra Pradesh	0.867	0.236	0.676	0.360
Arunachal Pradesh	0.811	0.317	0.669	0.378
Assam	0.852	0.281	0.717	0.429
Bihar	0.767	0.427	0.490	0.643
Chhattisgarh	0.854	0.260	0.635	0.390
Delhi	0.935	0.145	0.172	1.785
Gujarat	0.890	0.251	0.321	1.023
Himachal Pradesh	0.927	0.147	0.845	0.289
Haryana	0.875	0.267	0.488	0.520
Jharkhand	0.802	0.338	0.521	0.541
Jammu and Kashmir	0.819	0.277	0.335	0.953
Karnataka	0.881	0.229	0.683	0.398
Kerala	0.821	0.354	0.454	0.875
Meghalaya	0.817	0.302	0.762	0.467
Maharashtra	0.933	0.161	0.826	0.346
Manipur	0.806	0.304	0.462	2.798
Madhya Pradesh	0.867	0.266	0.294	2.204
Mizoram	0.938	0.146	0.343	3.559
Nagaland	0.857	0.226	0.479	0.859
Odisha	0.895	0.273	0.612	0.893
Punjab	0.875	0.212	0.787	0.381
Rajasthan	0.750	0.451	0.499	0.727
Sikkim	0.880	0.217	0.821	0.357
Tamil Nadu	0.772	0.388	0.797	0.451
Tripura	0.840	0.226	0.786	1.055
Uttaranchal (Uttarakhand)	0.878	0.220	0.726	0.508
Uttar Pradesh	0.857	0.234	0.608	0.606
West Bengal	0.849	0.230	0.735	0.451

Source: Author's calculation based on unit-level data from NFHS-3 for 2005–06, Ministry of Health and Family Welfare, Government of India.

In order to find out the relation between functioning-based approach and income-based approach of well-being, we compare the ranking of the states according to indicators based on both of the approaches for men and women. We rank the states according to the average values of male and female well-being indices. As an income-based indicator of well-being, we choose another average value, that is, the per capita NSDP for each of the 28 states during 2005–06 and rank the states according to it. Table 2 displays the ranking of the states according to male and female well-being indices and also according to per capita NSDP during 2005–06. We observe huge difference in the rankings of the states according to average well-being indices and per capita NSDPs.

Table 2: Ranking of States According to Average Male and Female Well-being Indices, and Per Capita NSDP during 2005–06

State	Average Male Well-being Index	Ranking According to Average Male Well-being Index	Average Female Well-being Index	Ranking According to Average Female Well-being Index	Per Capita NSDP (Rupees)	Ranking According to Per Capita NSDP
Mizoram	0.9378	1	0.3431	24	18,616	16
Delhi	0.9349	2	0.1722	28	48,885	1
Maharashtra	0.9326	3	0.8255	2	28,683	3
Himachal Pradesh	0.9268	4	0.845	1	27,447	6
Odisha	0.895	5	0.6121	15	13,877	24
Gujarat	0.8902	6	0.3214	26	26,268	7
Karnataka	0.8807	7	0.6825	11	22,322	9
Sikkim	0.8798	8	0.8211	3	20,777	12
Uttarakhand	0.8783	9	0.7265	9	20,219	13
Punjab	0.8749	10	0.7866	5	28,487	4
Haryana	0.8745	11	0.4882	20	32,980	2
Madhya Pradesh	0.8669	12	0.2936	27	12,567	26
Andhra Pradesh	0.8666	13	0.6762	12	21,728	10
Nagaland	0.8574	14	0.479	21	17,008	18
Uttar Pradesh	0.8571	15	0.6081	16	10,758	27
Chhattisgarh	0.8545	16	0.6355	14	14,694	22
Assam	0.8517	17	0.7172	10	14,419	23
West Bengal	0.8489	18	0.7347	8	20,187	14
Tripura	0.84	19	0.7859	6	21,524	11
Kerala	0.8205	20	0.454	23	27,714	5
Jammu and Kashmir	0.8189	21	0.3355	25	16,086	19
Meghalaya	0.8175	22	0.7621	7	18,870	15
Arunachal Pradesh	0.8106	23	0.6689	13	18,179	17
Manipur	0.8056	24	0.4618	22	14,663	21
Jharkhand	0.8015	25	0.5211	17	12,950	25
Tamil Nadu	0.772	26	0.7971	4	25,558	8
Bihar	0.7668	27	0.49	19	6,745	28
Rajasthan	0.7502	28	0.4992	18	15,736	20

Source: As for Table 1 and *Handbook of Statistics on Indian Economy*, 2009–10.

To compare ranking of states according to average well-being indices and per capita NSDP in a better way, we compute the Spearman's rank correlation coefficients first between ranking according to average male well-being indices and per capita NSDP and second between ranking according

to average female well-being indices and per capita NSDP (Table 3).

Figures in Table 3 show that the correlation between well-being based ranking for men and per capita NSDP based ranking is positive and highly significant with a value close to 0.5. While the correlation between well-being based ranking for women and per capita NSDP-based ranking is positive but insignificant, with a value close to 0.3. This implies that although income significantly determines the well-being of men, there are some other factors which may have considerable impact on it. While income can determine only a small portion of well-being of women there must be many other factors which significantly influence it.

Table 3: Spearman's Rank Correlation Coefficients

Spearman's Rank Correlation Coefficient	Average Male Well-being Index (Sig 2-tailed)	Average Female Well-being Index (Sig 2-tailed)
Per capita NSDP	0.464 (0.013)	0.259 (0.182)

Source: As for Table 2.

4 Well-being Equation: Methodological Issues

A more flexible way to find out the significant explanatory factors behind variations in male and female well-being indices is to estimate a well-being equation with wealth and several conversion factors as explanatory variables. We have constructed our well-being equation in the frame of pooled data from two separate samples of NFHS, that is, the sample of male respondents and that of female respondents. The detailed construction of the well-being equation is shown in the Appendix.

5 Gender and Well-being: Empirical Results

The well-being equation has been estimated using the OLS method. The sample used in this study includes 1,94,106 persons in the pooled sample in which 73,185 persons are men and 1,20,921 persons are women. The estimated results are shown in Table 4.[10] Table A1 (in the Appendix) explains the variable names used in Table 4.

In the well-being equation, the negative and significant coefficient for female dummy implies that women had significantly lower well-being than men. Positive and significant coefficient of the wealth index for men implies that increase in wealth significantly increases the well-being of men. The positive and significant effect of wealth is more prominent for the well-being of women. Age of men has positive and significant effect on the well-being of men, whereas, well-being of women declines significantly with increase in age. Well-being of the husband in a female-headed household is not significantly higher than that of the other male members. While the well-being of the wife in a male-headed household is significantly lower than that of the other female members.

Table 4: OLS Estimates of Well-being Equation

Variables	Coefficients	t-statistic	P>|t|
intercept	0.739	84.25	0.000
fem	-.0782	-7.12	0.000
wlth	0.117	31.97	0.000
wlth_fem	0.045	9.74	0.000
age	0.001	7.47	0.000
age_fem	-0.003	-18.79	0.000
nonspouse	-0.004	-1.52	0.129
nonspouse_fem	0.018	4.72	0.000
famsize	0.002	3.38	0.001
famsize_fem	-0.005	-8.76	0.000
hindu	0.003	2.77	0.006
hindu_fem	-0.001	-1.35	0.177
uppercaste	0.008	3.92	0.000
uppercaste_fem	0.003	1.39	0.165
rural	-0.018	-5.87	0.000
rural_fem	-0.018	-4.31	0.000
peninplt	0.001	0.22	0.826
peninplt_fem	-0.026	-3.70	0.000
indgngpln	-0.004	-0.62	0.538
indgngpln_fem	-0.168	-25.00	0.000
dsrt	-0.100	-9.07	0.000
dsrt_fem	0.075	84.25	0.000
F	1647.84 (0.000)		
R-Squared	0.369		
Adj R-Squared	0.368		

Source: Author's calculation based on data as for Table 1.

With the increase in the family size, while well-being of male members significantly increases, that of female member significantly declines. Well-being of Hindu men is significantly higher than men from other religious communities, though Hindu women do not enjoy a significantly better life than women from other religious communities. Well-being of upper-caste men is significantly higher than men from Scheduled Castes (SCs) and Scheduled Tribes (STs), whereas well-being of upper-caste women is not significantly higher than that of SC and ST women. Situation of both rural men and women is significantly worse than that of urban men and women in terms of well-being and deprivation of rural women is higher than that of rural men. The well-being of men from peninsular plateau area is not significantly higher than that of men from northern mountain area. While women from northern mountains have significantly better life than women from peninsular plateau. Well-being of men from the Indo-Gangetic plains is not significantly lower than that of men from northern mountain area, whereas well-being of women from Indo-Gangetic plains is significantly lower than that of women from northern mountains. Situation of both men and women from desert areas is significantly worse than that of men and women from northern mountains, though deprivation of women from deserts is lower than that of men from deserts.

6 Conclusions

This study analyses the interpersonal differences in attainment of well-being among men and women in 28 states of India by using unit-level data from NFHS-3 during 2005–06. We have identified major non-income factors affecting personal well-being that may cause significant differences of well-being among men and women. Ranking of states on the basis of well-being indices constructed in this study, for both male and female, have been compared to the ranking based on per capita NSDP to find out the relevance of income-based approach in explaining personal well-being.

We observe a negligible variation of well-being among men, while a significant variation of it among women within a state. Our empirical results imply that men's well-being is determined significantly by income along with some other factors. While women's well-being is not determined largely by income but by other non-income dimensions, particularly in the countryside.

It is clearly evident from our analysis that in terms of well-being women are lagging far behind men both in rural and urban areas in India. Higher wealth improves personal well-being irrespective of gender dimensions in India. But other non-income parameters have a conflicting impact on well-being for men and women. Older age, for example, brings

more prestige and respect for men within Indian families and their well-being increases. On the contrary, as age increases, women become less capable of doing household chores and caring works for their family members. Perhaps due to this reason they lose prestige and sympathy within Indian families and their well-being declines.

The empirical results of this study suggests that male members either in male-headed or female-headed households somehow enjoy more privilege and a higher status in terms of well-being than female members. In a majority of Indian families, male members have been favoured more than female members in terms of education, food and all the other benefits and the former have commanding power in almost every family matter. On the contrary, in the male-headed households, married women are more deprived than other female members. It is, in fact, evident in everyday life in Indian society in the form of dowry deaths, wife beatings, drop-out of girl children and killing of female foetus. Our empirical findings are indicative of such undesirable events as happened in India.

Our result shows that large family size does not have negative influence on the well-being of men in India, whereas women are harmfully affected by it. Once again, it is evident that men always relish all the benefits within a family and therefore their share does not decline and well-being is not affected adversely by non-income parameters. Ironically, women bear the entire burden of larger family size and their well-being declines. Our result reveals that Hindu and upper-caste men are in a better position than men from religious minorities and backward castes, whereas, situation of women is almost the same for all religious groups and castes.

According to our results, the situation of both rural men and women is worse than their urban counterparts. Rural areas are backward, lack many facilities of life, and rural people are less educated, less liberal, and superstitious. Lives of people in Indian villages are often threatened economically, socially and politically. Therefore, our result is quite obvious. Levels of well-being of men in almost all the agroclimatic areas are approximately the same in India, except the lower level in desert areas. Life is very tough in desert areas probably due to unfriendly climatic conditions. While the situation of women in northern mountains is significantly better than that of women in all the other agroclimatic regions. We obtained this result, perhaps because women in northern mountains are much more hard-working, self-sufficient, smart and healthier than women in other agroclimatic areas of India.

NOTES

1 Human Development Index is a composite index of life expectancy, education, and income used to rank the countries into four tiers of human development. Ironically, as an alternative measure of well-being, HDI has been criticised for incorporating GDP per capita itself as a component and also for non-inclusion of the dimensions of life other than health and education (Dasgupta 1990, 1993; Anand and Ravallion 1993; Anand and Sen 2000; Sen 1981, 1999).

2 Human Poverty Index concentrates on the deprivation in the three essential elements of human life already reflected in the HDI: longevity, knowledge and a decent standard of living.

3 Using micro-level data, Balestrino (1996) observed a considerable proportion of functioning-poor are not income-poor within a group of individuals in an affluent Italian town.

4 Laderchi (1997) evaluated non-income dimensions of well-being and compared them with income dimension. The link between the income and non-income dimension of well-being was found to be weak.

5 Martinetti (2000) used fuzzy set theory to investigate well-being in a multidimensional frame of Sen's concept of well-being in Italy. Martinetti found the existence of deprivation and inequality in the functioning space although they seemed to be lower if compared with deprivation and inequality in the income space.

6 Balestrino and Sciclone (2001) built an index of well-being as functionings achievement and compared the well-being ranking of the regions of Italy with income-based rankings. They claimed a substantial difference between income-based and functioning-based measures of well-being using data of Italy.

7 Using NFHS-2 and NFHS-3 data, Majumder computed well-being indices of women for the states and union territories of India and ranked the states according to the well-being indices as well as according to per capita NSDP. Such rankings were found to differ sharply. Majumder also did multivariate analyses to locate variations in the levels of achievements of women in each of the above-mentioned dimensions with a set of possible explicative or conversion factors.

8 Wealth Index for each individual has already been constructed by NFHS. We have used it in our analysis.

9 The data covers all the states of India, namely, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Delhi, Gujarat, Himachal Pradesh, Haryana, Jharkhand, Jammu and Kashmir, Karnataka, Kerala, Meghalaya, Maharashtra, Madhya Pradesh, Manipur, Mizoram, Nagaland, Odisha, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttaranchal (Uttarakhand), Uttar Pradesh and West Bengal. However, we have not included the union territories in our study.

10 In the independently pooled regression, interactive dummy variables have been found to have high correlation with the original dummies and the gender dummy with which the interaction has been done. Variance Inflation Factors (VIFs) are found to be quite high. In fact, such collinearities bound to come whenever one does any independently pooled regression analysis with interactive dummies. But such collinearity does not affect the results of the regression. To test this hypothesis, the author has done separate regressions for men and women with the same original variables without the interactive dummies. There is no multicollinearity in the separate regressions. The correlation coefficients between the independent variables are low and VIF is also low. However, the result is identically the same as that of the pooled analysis. The only difference is the higher values of adjusted R squares in the separate regressions, which are not very meaningful in a model where most of the variables are categorical. Therefore, multicollinearity in the pooled regression model has been ignored, since it does not affect the results.

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Appendix

Factor Analysis

Factor analysis allows us to reduce a set of reasonably associated variables to a few representative components (orthogonal between them). These components are able to explain most of the original variance with minimum information loss. We can comprehend a latent phenomenon, that is, well-being, by extracting a small number of factors from the set of original indicator variables. "These factors summarise the entire information that was already there within the original data. Each factor can be interpreted on the basis of its correlation with the original variables" (Balestrino and Sciclone 2001: 8). In factor analysis, the observed variables can be expressed in terms of a smaller set of common factors and to a unique factor. Common factors explain the intercorrelations among the variables; the unique factor accounts for that portion of the variation of a variable which cannot be attributed to the correlation of the variable with other variables in the set. More specifically, the common factors contribute to the variance of at least two of the observed variables, whereas the unique factor contributes to the variance of only one of the observed variables.

The characteristic equation for factor analysis can be written as

$$V_i = \lambda_{i1}F_1+\lambda_{i2}F_2+.....+\lambda_{im}F_m+\alpha_i e_i \quad ...(1)$$

where,
V_i = i-th variable, where i= 1, 2,……., n
λ_{ik}=regression coefficient of the k-th common factor for predicting
the i-th variable, where k=1, 2, ….., m. ($m < n$)
F_k = k-th common factor
e_i = i-th unique factor
α_i= regression coefficient of the i-th unique factor
The common factors can alternatively be written as linear combinations of the variables, in the following way

$$F_k = l_{k1}V_1+l_{k2}V_2+.....+l_{kn}V_n \quad ...(2)$$

where,
V_i = i-th variable, where i= 1, 2,……., n
F_k = k-th common factor
l_{ki}= factor loading between the k-th factor and the i-th variable

In any factor analysis, the first common factor is the linear combination of *variables* which accounts for most of the variance. In our analysis, in all the states, first factor has been found to account for 80% or more of the total variance. Therefore, for each state, we have retained the first factor only. The equation of the first factor, which is the only one factor used in our analysis, can be written as

$$F_i = l_{i1}V_1+l_{i2}V_2+.....+l_{in}V_{ni} \quad ...(3)$$

where,
i = 1, 2, ……., m (number of states)
l_{ij} = factor loading[1] between the first factor of i-th state and j-th variable, where j= 1, 2, ….., n_i (number of variables in i-th state)

Since the indicators of well-being index are categorical, we could not use the Pearson's correlations matrix which is generally used in factor analysis in case of continuous variables. We have used the Polychoric correlation matrix which is suitable for our factor analysis of categorical variables. Factor loadings have been calculated for male and female respondents of each state. The factor loadings are used to determine the weights for each of the indicator variable. Now we transform the indicator variables to their scaled versions, that is, original variables are divided by their own standard deviation to make the variables with unit variance (scaled). The scaled variables are now multiplied by the weights and summed to produce the individual's well-being index. In the DHS method, scaled indicator values are multiplied directly by the loadings and summed to produce the index value. Here, we have used a different weight.

The formula[1] of our weight is

$$w_{ij} = \frac{l_{ij}^2}{\sum_{j=1}^{n_i} l_{ij}^2} \quad ...(4)$$

where,
w_{ij} = weight corresponding to j-th variable in i-th state.
l_{ij} = factor loading between the first factor of i-th state and j-th variable.
i = 1, 2, ……., m (number of states)
j = 1, 2, ……., n_i (number of variables in i-th state)

Using the above-mentioned formula, we construct weights corresponding to each scaled indicator variable and multiply them by those weights to produce the well-being index for each male and female respondent within our sample for all the 28 states.

The equation of the well-being index is

$$wlb_i = w_{i1}V^*_1+w_{i2}V^*_2+w_{i3}V^*_3+w_{i4}V^*_4+w_{i5}V^*_5+w_{i6}V^*_6 \quad ...(5)$$

wlb_i = well-being index of any individual in the i-th state
V^*_j= j-th scaled indicator variable, where j= 1,2,3,….,6.

Construction of Well-being Equation

The well-being equation in the frame of pooled data from two samples is specified as

$$\begin{aligned} wlbi = {} & \alpha_0+\alpha_1 fem+\alpha_2 wlth+\alpha_3 wlth\_ \\ & fem+\alpha_4 age+\alpha_5 age\_ \\ & fem+\alpha_6 nonspouse+\alpha_7 nonspouse\_ \\ & fem+\alpha_8 famsize+\alpha_9 famsize\_ \\ & fem+\alpha_{10} hindu+\alpha_{11} hindu\_ \\ & fem+\alpha_{12} uppercaste+\alpha_{13} uppercaste\_ \\ & fem+\alpha_{14} rural+\alpha_{15} rural\_ \\ & fem+\alpha_{16} peninplt+\alpha_{17} peninplt\_ \\ & fem+\alpha_{18} indgngp\ ln+\alpha_{19} indgngp \\ & ln\_fem+\alpha_{20} dsrt+\alpha_{21} dsrt\_fem+\varepsilon \end{aligned} \quad ...(6)$$

The variable *fem* is a gender dummy variable, equal to 1 for women and 0 for men; *wlth* is the wealth index of each individual which has been constructed by NFHS and used in our analysis; *age* is the age in years for each respondent; *nonspouse* is the dummy variable for a particular type of member of the household, equal to 1 for a family member who is not the spouse of the head and 0 otherwise; *famsize* is the size of the family; *hindu* is the religion dummy variable, equal to 1 for Hindu respondents and 0 otherwise; *uppercaste* is the caste dummy variable, equal to 1 for respondents from upper caste and 0 otherwise; *rural* is the dummy variable for rural areas, equal to 1 for respondents from rural areas and 0 otherwise. We have divided the agroclimatic areas of India into four zones, viz. northern mountains, peninsular plateau, Indo-Gangetic plains and Thar deserts. Out of these four zones we have used dummy variables for three zones, viz. peninsular plateau, Indo-Gangetic plains and Thar deserts and due to the problem of multicollinearity, we have dropped the dummy variable for northern mountains from the equation and considered it as the comparison dummy. The variable *peninplt* is the dummy variable for the peninsular plateau area, equal to 1 for respondents living in peninsular plateau area, 0 otherwise; *indgngpln* is the dummy variable for the Indo-Gangetic plain area, equal to 1 for respondents residing in Indo-Gangetic plains and 0 otherwise; *dsrt* is the dummy variable for the Thar desert area, equal to 1 for the respondents from Thar desert area and 0 otherwise.

In our analysis, we have used interaction dummy variables of all the explanatory variables with the female dummy variable. The variable *wlth_fem* is the interaction dummy

variable of wealth index for female respondents, while α_2 acts as the coefficient for wealth index for males and $(\alpha_2+\alpha_3)$ is the coefficient for wealth index for females; *age_fem* is the interaction dummy variable of age of female respondents, $\alpha_4$acts the coefficient for age of males $(\alpha_4+\alpha_5)$ and is the coefficient for age of females; α_6 is the coefficient for the male family member who is not the spouse of the head and $(\alpha_6+\alpha_7)$ is the coefficient for the female family member who is not the spouse of the head; α_8 acts as the coefficient for the family size of a male respondent and $(\alpha_8+\alpha_9)$ acts as the coefficient for the family size of a female respondent; α_{10} is the coefficient for the Hindu males and $(\alpha_{10}+\alpha_{11})$ is the coefficient for Hindu females; α_{12} acts as the coefficient for the upper-caste males and $(\alpha_{12}+\alpha_{13})$ acts as the coefficient for upper-caste females; α_{14} acts as the coefficient for the rural males and $(\alpha_{14}+\alpha_{15})$ acts as the coefficient for rural females; α_{16} is the coefficient for the males from peninsular plateau area and $(\alpha_{16}+\alpha_{17})$ is the coefficient for the females from peninsular plateau area; α_{18} acts as the coefficient for the males from Indo-Gangetic plain area and $(\alpha_{18}+\alpha_{19})$ acts as the coefficient for the females from Indo-Gangetic plain area; α_{20} is the coefficient for the males from Thar desert area and $(\alpha_{20}+\alpha_{21})$ is the coefficient for the females from Thar desert area; ε is an i.i.d. idiosyncratic error term with mean zero and constant variance σ^2_{ε} measuring the effects of unobservable random factors.

Table A1: Explanation of Variable Names Used in Table 4

Name of the Variable	Explanation
fem	gender dummy variable, equal to 1 for women and 0 for men
wlth	wealth index of each individual which has been constructed by NFHS and used in our analysis
wlth_fem	interaction dummy variable of wealth index for female respondents
age	age in years for each respondent
age_fem	interaction dummy variable of age of female respondents
nonspouse	dummy variable for a particular type of member of the household, equal to 1 for a family member who is not the spouse of the head and 0 otherwise
nonspouse_fem	interaction dummy variable of female family member who is not the spouse of the head
famsize	family-size of a male respondent
famsize_fem	family-size of a female respondent
hindu	religion dummy variable, equal to 1 for Hindu respondents and 0 otherwise
hindu_fem	interaction dummy variable of Hindu female
uppercaste	caste dummy variable, equal to 1 for respondents from upper caste and 0 otherwise
uppercaste_fem	interaction dummy variable of upper-caste females
rural	dummy variable for rural areas, equal to 1 for respondents from rural areas and 0 otherwise
rural_fem	interaction dummy variable of rural females
peninplt	dummy variable for the peninsular plateau area, equal to 1 for respondents living in peninsular plateau area, 0 otherwise
peninplt_fem	interaction dummy variable of the females from peninsular plateau area
indgngpln	dummy variable for the Indo-Gangetic plain area, equal to 1 for respondents residing in Indo-Gangetic plains and 0 otherwise
indgngpln_fem	interaction dummy variable of the females from Indo-Gangetic plain area
dsrt	dummy variable for the Thar desert area, equal to 1 for the respondents from Thar desert area and 0 otherwise
dsrt_fem	interaction dummy variable of the females from Thar desert area