Measuring Inter-Personal Variations of Well-being in India: A Household-Level Study on Sen's Capability Approach

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Income and material wealth, although essential, are not enough for overall well-being of people particularly in the less developed world. Differences in personal characteristics and external circumstances often lead to inter-personal variations in capacity of utilising the available resources. Thus social justice alongwith economic justice is indispensible for well-being. Sen's capability approach places human beings at the centre of development. In this approach, under-development 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 desires. This approach primarily considers personal well-being as a set of functionings, the actual achievements of a person in terms of health, nutrition, education, empowerment etc. Our paper measures inter-personal variations in the achievement of functioning-based well-being of men and women in 28 states of India and tries to find out the major explanatory factors behind such variations. Our study utilises unit-level data from the Indian National Family Health Survey (NFHS-3), 2005-06. To represent a basic-level of human rights endowment that should be guaranteed to all people, we incorporate six functionings for men and women separately to construct our male and female well-being indices. In order to build the index of well-being, we use the principal component-based factor analysis method. We observe huge difference in the rankings of the states according to well-being indices and wealth-indices. To find out the significant explanatory factors behind variations in well-being indices, we use the OLS regression method, taking the well-being index of an individual as the dependent variable and wealth-index of the individual as well as several conversion factors as the independent variables. Our study shows that women are far behind men in India in terms of well-being. From the regression analyses we find that level of well-being of men and women in India varies sharply according to different conversion factors. However, well-being of all individuals is found to be significantly related to wealth they possess.

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1. Introduction

Income and material wealth, although essential, are not enough for overall well-being of people particularly in the less developed world. Differences in personal characteristics and external circumstances often lead to interpersonal variations in ability of utilising the available resources. Thus social justice alongwith economic justice is crucial for human well-being (Sen 1980; 1984; 1985; 1987; 1992; 1999). Sen's capability approach puts human beings at the centre of development. Following Adam Smith, Sen begins his approach admitting that economic growth and expansion of goods and services are necessary for human development. However, following Aristotle's philosophy he further argues that wealth is obviously not the thing which we are pursuing for. It is merely a medium which can be used to achieve something else (Sen, 1990, p.44). Therefore, while judging the quality of life, we should not only concentrate the accumulated wealth by people, rather, we should consider whether people are able to achieve a desired life with that wealth. Sen believes that it is the opportunity to live a good life, rather than the accumulation of resources, that matters most for well-being and that opportunities result from the capabilities that people have. Hence, resources do not have an intrinsic value; instead their value is derived from the opportunity that they provide for the people. In capability approach, under-development is not a deprivation of basic needs, but it 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 multi-dimensional concept. There are many dimensions of well-being that the economic resources are not able to capture. Income, wealth and consumption are the crude measures of the quality of life because they are not able to fully describe what people can really achieve with these resources. They cannot clearly describe the reasons behind strong differences and inequalities in standards of living among people with same income or wealth status. 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 do some activities according to his/her wishes which uplift his/her standard of living. These activities can be referred to as functionings. The whole set of functionings depends on the capabilities to function, i.e. 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 desired 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 not only related to material wealth possessed by the individual but they are also significantly related to certain conversion factors which influence the individual to convert available resources and inherent characteristics into actual well-being, e.g. the individual's inherent characteristics like health, gender etc., the socio-economic and institutional set-up within which the individual lives and other factors like age, position within the family, family-size, religion, caste, employment, rural/urban area, agro-climatic area etc[1] .

Sen's approach has been a remarkable development over the conventional use of 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 wellbeing. The Human Development Index (HDI) (UNDP, 1990) was constructed using Sen's approach to make international comparisons of achievements and deprivations of well-being. It is a composite index of life expectancy, education, and income used to rank the countries into four tiers of human development. Early draft of HDI was prepared by Pakistani economist Mahbub ul Haq in 1990 with the help of a group of well-known development economists including Paul Streeten, Frances Stewart, Gustav Ranis, Keith Griffin, Sudhir Anand and Meghnad Desai. Sen was initially against this idea of a simple composite measure of human development. However, Haq convinced him that use of this single number would shift the attention of policy-makers around the world from concentration on economic to human well-being. Subsequently, Sen went on to help Haq develop the index. Ironically, as an alternative measure of well-being, HDI has been criticized 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, 1992; Anand & Ravallion, 1993; Anand and Sen, 2000; Sen, 1999). Following these criticisms, UNDP corrected its measurements and replaced HDI by Human Poverty Index (HPI) with a variant for developing and industrialized countries. HPI was considered to better reflect the extent of deprivation compared to the HDI. It

[1] The relation between a good and the achievement of certain beings and doings is captured with the term 'conversion factor', i.e. the degree in which a person can transform a resource into a functioning. The conversion factors thus represent how much functioning one can get out of a good or service. There are three types of conversion factor, viz. *personal conversion factors, social conversion factors and environmental conversion factors.*

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. The HPI is derived separately for developing countries (HPI-1) and a group of select high-income OECD countries (HPI-2) to better reflect socio-economic differences and also the widely different measures of deprivation in the two groups. Standard of Living (SL) and Quality of Life (QL) are other two much-used indices for international comparisons of deprivation, which use different methods of aggregating and have different theoretical foundations. Standard of living generally refers to the level of wealth, comfort, material goods and necessities available to a certain socioeconomic class in a certain geographic area. On the other hand, quality of life is more subjective and intangible. It is associated several freedoms and rights to enjoy a good life. It represents an ideal to be achieved, rather than a baseline state of affairs.

Rankings using HDI-based well-being indices, although deviate significantly from GNP-based rankings, are aggregative measures for international as well as intra-national comparison of development. All the functioning indicators used to construct these indices are merely aggregative concepts, e.g. 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 can provide little insight on the well-being of the individuals. Capability Approach emphasises on the inter-personal variation in conversion ability, which results in the inequality of individual-level well-being. Therefore, ideal study of well-being should be based on individual-level data.

Using micro-level data, Balestrino (1996) observed that a considerable proportion of functioning-poor are not income-poor within a group of individuals in an affluent Italian town. Ruggeri 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. Chiappero 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. 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 the income-based rankings. They claimed a substantial difference between income-based and

functioning-based measure of well-being using data of Italy. Majumder (2007, 2009) carried out a multidimensional assessment of well-being of Indian women using the fuzzy sets theory following Martinetti. Using NFHS-2 and NFHS-3 data, Majumder computed well-being indices of women for the states and union territories of India and ranked those regions 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 various dimensions of well-being with a set of possible explicative or conversion factors. However, Majumder's analysis is concentrated on the achievements of women only. A comparative analysis of the achievements of men and women and also of different religious and social groups of India is quintessential. Ironically, very few comprehensive works have been done on well-being using Capability Approach in Indian context which has gone to the extent of empirical investigation.

Under this backdrop, this study is an attempt to measure the inter-personal variations in the achievement of well-being among men and women in India and to find out the major explanatory factors behind such variations. Our study utilises unit-level data from the Indian 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 functioning 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 applied by DHS[2] 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. After constructing the individual well-being indices for men and women, we have taken the mean values of male and female well-being indices for all the 28 states of India and ranked them according to the values. We have also ranked the states according to the per capita NSDP in 2005-06. We compare the ranking on the basis of well-being indices and NSDP for both men and women.

[2] The Demographic and Health Surveys (DHS) Program is responsible for collecting and disseminating accurate, nationally representative data on health and population in developing countries. The project is implemented by ICF International and is funded by the United States Agency for International Development (USAID) with contributions from other donors such as UNICEF, UNFPA, WHO, and UNAIDS. The DHS Program has been active in over 90 countries in Africa, Asia, Central Asia; West Asia; and Southeast Asia, Latin America and the Caribbean. In India, DHS programme is known as National Family Health Survey (NFHS).

To find out the significant explanatory factors behind variations in individual well-being indices, we use the OLS regression method, taking the well-being index of an individual as the dependent variable and wealth-index of the individual[3] 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, employment status, rural/urban area and agro-climatic 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 average well-being index as well as according to 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. Section 6 concludes.

2. Data and methodological issues in construction of Well-being Index

The unit level data from the *National Family Health Survey* (NFHS-3) for 2005-06 conducted by the Ministry of Health and Family Welfare (MOHFW), Government of India (GOI), have been used in this study. The sample consists of 194106 individuals from 28 states of India[4], out of which 62 per cent are women and remaining 38 per cent are men. NFHS collects huge 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 immunizations, child health, and child feeding practices, women's and children's nutrition, utilization of ICDS Services, status of spousal violence, sexual life and HIV/AIDS and other sexually transmitted infections. On the other hand, from the men's file, we get information on background characteristics, reproductive behaviour and intentions, knowledge and use of contraception, male involvement in health care, sexual life, health and nutrition and attitude toward gender roles. However, in order to construct the well-being indices for men and women and make those indices comparable, we have

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

[4] 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, Uttar Pradesh and West Bengal. However, we have not included the union territories in our study.

incorporated 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 files.

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 social 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 and household purchases for daily needs and regarding his own healthcare. If the man has the final decision-making power in all of the abovementioned areas or at least enjoys equal power with his wife, we have considered him to be autonomous. NFHS collects 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. On the other hand, if he thinks that he himself alone should decide how to spend his wife's income, he is considered to be non-liberal.

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 upto 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 social media, she is considered to be socially aware. We can obtain the

information about whether the female respondent has decision-making power regarding spending her own income, regarding large household purchases and household purchases for daily needs and regarding her own healthcare. If she has the final decision-making power in all the abovementioned areas or at least enjoys equal power with her husband, we have considered her to be autonomous. NFHS collects information on domestic violence asking several questions related to it. We can get information from the female respondent about whether her husband ever pushed her, shook or threw something on 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, physically forced sex when she was not ready for it, forced other sexual acts when she was not willing, 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 yes to any one question, she is considered to be unsafe.

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. Shokkaert and Van, Ootegem (1990), Knox Lovell *et al*. (1994), Delhausse (1995) and Nolan and Whelan (1996), Balestrino and Sciclone (2001) have used factor analysis as an instrument of construction of well-being index in their studies. Sen (1990) also trusted upon factor analysis as a suitable instrument for operationalising his approach. DHS uses the 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 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.

Factor analysis allows us reducing 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, i.e. 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. 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 inter-correlations 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

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

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 liner combinations of the variables, in the following way

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

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 per cent 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

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

where,

F_i = first factor of the *i*-th state, where *i*= 1, 2, ……., m (number of states)

l_{ij} = factor loading[5] 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[6] 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, i.e. 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[7].

The formula[8] 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)

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[5] Factor loadings are the correlations between each variable and the factor.

[6] Polychoric correlation is a technique for estimating the correlation between two theorised normally distributed continuous latent variables, from two observed ordinal variables.

[7] This weight was originally used by M.A.C.S.S. Fernando, S. Samita and R. Abeynayake in their Principal Component analysis (2012) .

[8] Since the formula includes the factor loading or correlation coefficient between the first factor and each of the variables, the weight will be particular for that variable. This overcomes the weakness of assigning a common weight to all the variables in a single subset. In addition, the weight includes the squared coefficient of correlation which actually represents the coefficient of determination between the variable and the first factor. Therefore, it actually represents the amount of variability, which each of the variable represents out of the total variability represented by the first factor (Fernando, Samita and R. Abeynayake, 2012).

j= 1, 2, …….., n_i (number of variables in *i*-th state)

Using the abovementioned 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, where *i*=1, 2, 3, ……., 28.

V_j^* = *j*-th scaled indicator variable, where, j= 1,2,3,….,6.

3. Comparison of Well-being Index based ranking and Income based ranking of the states

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 situation 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 these state-level averages according to their 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, except the case of Tamil Nadu where average female well-being index is slightly higher than average male well-being index. The positive 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. On the other hand, difference is lower in the states like Himachal Pradesh, Meghalaya, Maharashtra, Punjab, Sikkim, Tripura, Uttaranchal and West Bengal. Here we have only compared the average value of male well-being index with that of female well-being index. Average value of well-being index has the general limitation of any average. Being a central value, 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. 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 Different 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	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 *National Family Health Survey* (NFHS-3) for 2005-06, Ministry of Health and Family Welfare (MOHFW), Government of India.

Table 2 Ranking of the states according to average male well-being index, average female well-being index 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	18616	16
Delhi	0.9349	2	0.1722	28	48885	1
Maharashtra	0.9326	3	0.8255	2	28683	3
Himachal Pradesh	0.9268	4	0.845	1	27447	6
Odisha	0.895	5	0.6121	15	13877	24
Gujarat	0.8902	6	0.3214	26	26268	7
Karnataka	0.8807	7	0.6825	11	22322	9
Sikkim	0.8798	8	0.8211	3	20777	12
Uttaranchal	0.8783	9	0.7265	9	20219	13
Punjab	0.8749	10	0.7866	5	28487	4
Haryana	0.8745	11	0.4882	20	32980	2
Madhya Pradesh	0.8669	12	0.2936	27	12567	26
Andhra Pradesh	0.8666	13	0.6762	12	21728	10
Nagaland	0.8574	14	0.479	21	17008	18
Uttar Pradesh	0.8571	15	0.6081	16	10758	27
Chhattisgarh	0.8545	16	0.6355	14	14694	22
Assam	0.8517	17	0.7172	10	14419	23
West Bengal	0.8489	18	0.7347	8	20187	14
Tripura	0.84	19	0.7859	6	21524	11
Kerala	0.8205	20	0.454	23	27714	5
Jammu and Kashmir	0.8189	21	0.3355	25	16086	19
Meghalaya	0.8175	22	0.7621	7	18870	15
Arunachal Pradesh	0.8106	23	0.6689	13	18179	17
Manipur	0.8056	24	0.4618	22	14663	21
Jharkhand	0.8015	25	0.5211	17	12950	25
Tamil Nadu	0.772	26	0.7971	4	25558	8
Bihar	0.7668	27	0.49	19	6745	28
Rajasthan	0.7502	28	0.4992	18	15736	20

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

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 both 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, i.e. the per capita net state domestic product (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 index 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 NSDP.

To compare ranking of states according to average well-being indices and per capita NSDP in a better way, we compute the Spearman rank correlation coefficients first between ranking according to average male well-being indices and according to per capita NSDP and second between ranking according to average female well-being indices and according to per capita NSDP. Table 3 shows the Spearman rank correlation coefficients.

Table 3 Spearman rank correlation coefficients

Spearman 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

Figures in Table 3 shows 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. On the other hand, the correlation between well-being based ranking for women and per capita NSDP based ranking is positive and 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. On the other hand, income can determine only a small portion of well-being of women and there must be many other factors which significantly influence it.

4. Estimating 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 well-being equation with well-being

index as the dependent variable and wealth index 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, i.e. the sample of male respondents and that of female respondents.

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

$$wlb = \alpha_0 + \alpha_1 fem + \alpha_2 wlth + \alpha_3 wlth\_fem + \alpha_4 age + \alpha_5 age\_fem + \alpha_6 nonspouse + \alpha_7 nonspouse\_fem + \alpha_8 famsize + \alpha_9 famsize\_fem + \alpha_{10} hindu + \alpha_{11} hindu\_fem + \alpha_{12} uppercaste + \alpha_{13} uppercaste\_fem + \alpha_{14} empl + \alpha_{15} empl\_fem + \alpha_{16} rural + \alpha_{17} rural\_fem + \alpha_{18} peninplt + \alpha_{19} peninplt\_fem + \alpha_{20} indgngp\ln + \alpha_{21} indgngp\ln\_fem + \alpha_{22} dsrt + \alpha_{23} dsrt\_fem + \varepsilon \quad (6)$$

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 of the family 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; *empl* is the employment dummy variable, equal to 1 for employed respondents 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 agro-climatic areas of India into four zones, viz. northern mountains, peninsular plateau, Indo-Gangetic plains and Thor deserts. Out of these four zones we have used dummy variables for three zones, viz. peninsular plateau, Indo-Gangetic plains and Thor 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 Thor desert area, equal to 1 for the respondents from Thor 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, α_4 acts the coefficient for age of males and $(\alpha_4 + \alpha_5)$ 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} is the coefficient for the employed males and $(\alpha_{14} + \alpha_{15})$ is the coefficient for employed females; α_{16} acts as the coefficient for the rural males and $(\alpha_{16} + \alpha_{17})$ acts as the coefficient for rural females; α_{18} is the coefficient for the males from peninsular plateau area and $(\alpha_{18} + \alpha_{19})$ is the coefficient for the females from peninsular plateau area; α_{20} acts as the coefficient for the males from Indo-Gangetic plain area and $(\alpha_{20} + \alpha_{21})$ acts as the coefficient for the females from Indo-Gangetic plain area; α_{22} is the coefficient for the males from Thor desert area and $(\alpha_{22} + \alpha_{23})$ is the coefficient for the females from Thor 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.

5. Inter-personal variations in well-being - empirical results

The well-being equation has been estimated using the OLS method. The sample used in this study includes 194106 persons in the pooled sample in which 73185 persons are men and 120921 persons are women. The estimated results are shown in Table 4.

In the well-being equation, negative and significant coefficient for female dummy implies that women had significantly lower well-being than the men counterparts. Positive and significant coefficient of the wealth index for men implies that increase in wealth significantly increases the well-being of men. 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 of the head in a female-headed household is not significantly higher than that of the other male members. On the other hand, well-being of the wife of the head 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
empl	0.000	0.12	0.908
empl_fem	0.121	51.68	0.000
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 member 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 and scheduled tribes, whereas well-being of upper caste women is not significantly higher than that of scheduled caste and scheduled tribe women. Employment does not guarantee a higher level of well-being of men, though employed women have significantly higher level of well-being than unemployed 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. Well-being of men from peninsular plateau area is not significantly higher than that of men from northern mountain area. On the other hand, women from northern mountains have significantly better life than women from peninsular plateau. Well-being of men from 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 area 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 inter-personal 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. Well-being indices have been constructed separately for men and women with six basic functionings selected by applying principal component-based factor analysis of the survey data. Ranking of states on the basis of wellbeing indices constructed in this study, both for 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 wellbeing. To find out the significant explanatory factors behind variations in well-being indices, we have estimated the well-being equation using the OLS method. We have identified major non-income factors affecting personal wellbeing that may cause significant differences of wellbeing among men and women.

We observe a negligible variation of wellbeing among men, while a significant variation of it among women within a state. We also reveal that the rank correlation between well-being index and per capita NSDP across the states in India is significantly positive for men, but for women it is statistically insignificant. Our empirical results imply that men's wellbeing is determined significantly by income along with some other factors. On the other hand, women's wellbeing 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 dimension in India. But other non-income parameters have conflicting impact on wellbeing for men and women. Older age, for example, brings more prestige and respect for men within the 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 higher status in terms of well-being than the female members. In majority of the Indian families, male members have been favoured more than female members in terms of education, food and all the other benefits and the formers 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 the 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 better position than men from religious minorities and backward castes, whereas, situation of women is almost the same for all religious groups and castes.

There has been no significant difference between employed and unemployed men members in a family in terms of wellbeing defined in this study, while employed women are in far better position than unemployed women. This result is also not surprising as male members get prestige and respect from their wives and mothers within their families despite being unemployed. On the other hand, employment surely uplifts the standards of living for women both economically and socially.

According to our result, situation of both rural men and women are worse than their urban counterparts. Rural areas are backward, lack of all 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 agro-climatic areas are roughly same in India, except the lower level in the desert area. Life is very tough in desert areas probably due to unfriendly climatic conditions. On the other hand, situation of women in northern mountains is significantly better than that of women in all the other agro-climatic regions. We obtained such result, perhaps because women in northern mountains are much more hard-working, self-sufficient, smart and healthy than women in other agro-climatic areas of India.

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