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Gender Differential in Occupation and Income among the Elderly in India

Laishram Ladusingh[1] · Melody Thangjam[1]

Abstract The paper sheds light on changing occupation pattern and income and gender gap in the real earning of elderly 60 years and above in India. It is found that work participation of elderly in India has increase from 13.3% in 2004–05 to 16.4% in 2011–12 and for males the increase is significant from 19.4 to 23.3% while that for females is marginal from 7.1 to 10.1% during this period. Occupations classified as agricultural and animal farming, labourer, business, salaried and professional and part time worker constitutes 17.8, 55.9, 8.4, 12.8 and 5.1% respectively in 2004–05 and corresponding figures for 2011–12 are 17.6, 53.2, 2.7, 12.2 and 14.4% respectively. The mean annual earning for elderly engaged in the aforesaid occupation in order are Rs. 14,277, Rs. 19,315, Rs. 32,932, Rs. 93,880 and Rs. 44,811 in 2004–05 and the corresponding mean earning in 2011–12 after adjustment of inflation are Rs. 11,719, Rs. 27,591, Rs. 30,896, Rs. 109,673 and Rs. 21,078 respectively. The gender gap in earning is significant and has not change over time. Multigenerational living arrangement and residing rural areas are found to have deterrent effect on annual earning, while household income quintile has significant enhancing effect on annual earning but age and incidence of long term morbidities have no significant effect on annual earning. Contribution of endowment factors in gender in earning gap decreases.

Keywords Occupation · Gender · Annual income · Living arrangement

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Introduction

Transition from food hunting and gathering self-reliancelife to modern day life has caughtmany developing countries unprepared to meet growing social security and welfare needs of ever increasing elderly population. In the process of evolution to the welfare state the share of supporting welfare of the elderly by the state is gradually increasing as the traditional familial support mechanism is fading fast. Public welfare measures of elderly in place particularly in India fall far short of bare necessity as compared to the pace of increase of elderly population. The share of elderly 60 years and above to the total population has increase from 6.8% in 1991 to 8% in 2011 (Registrar General of India 1991, 2011). At the prevailing pace of demographic transition sixty plus population is expected to increase from 86.5 to 298.2 million during 2011–2050 (Rajan 2010) and proportion of 60 plus elderly in 2050 is projected to be 19% (Bloom 2011; Population Reference Bureau 2012; United Nations 2011). But public expenditure on social protection both central and state governments put together accounts for less than 2% of the GDP (Behrendt and Hagemejer 2009) and only about 11% of the labour force is covered by some social security programmes including retirement pension (Preeti and Ladusingh, 2013).Some of the social protection programmes in place are provision of availing food items at subsidised price through the public distribution system (PDS), the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) for assuring minimum days of employment, the Indira AwaasYojana (IAY) for housing, the RashtriyaSwasthyaBimaYojana (RSBY) for healthcare and the Indira Gandhi National Old Age Pension Scheme (IGNOAPS) for monetary subsistence assistance. The entitlement of these schemes are limited to 65 years older persons living below the poverty line (BPL) and most of these social security measures of elderly in India leaving aside those in formal employment are in the form of social assistance not adequate to sustain basic requirement of food, housing and healthcare (Narayana 2011). As a matter of fact elderly in India finance 63% of their lifecycle deficit of consumption of goods and services in excess of income from individual asset based reallocation that is asset income net of saving (Ladusingh 2013a, b). Under the circumstances it would be unrealistic to expect a sudden turnaround in public policy on social protection of elderly in India and expect social security coverage at par with the level in European and other developed countries. But an advantageous situation is that in India fertility has decline quite rapidly (Bhalla and Kaur 2011) and economic growth in the past two decades has improved despite economic slowdown in many countries (Chaudhary and Verick 2014). Thus a more tangible strategy to sustain the welfare of elderly is the promotion of longer work participation of elderly in order to lighten the burden of inevitable aging of population and also encourage healthy aging from individuals' perspective. Towards this objective research for policy inputs can begin by assessing the current occupational structure of elderly and their earning. Dhillon and Ladusingh (2013) found on the basis of long term projection that work participation rates among elderly males tends to decline over time while that among females has shown momentum of increase. This is corroborated from the findings of Dhar et al. (2015) that there is a declining trend in workforce participation rate among elderly during 1999–2000 and 2009–10, particularly among the urban and rural male. The authors have also found contrasting occupational pattern of elderly by residence, rural elderly were engaged more in primary sector while urban elderly work as

professional and in service sector. Singh and Das (2015) too foundnegative association between wagelabour participation and the age of the elderlyduring 1993–2010. Selvaraj et al. (2011) have provided evidence of elderly getting lower salary than younger workers for the same work and female elderly being paid less than their male counterpart. Among others Boserup (1970), Schultz (1990) and Tansel (2001) have propagated U-shape relationship between economic development and women's work participation though contested by some (Gaddis and Klasen 2014).

All the aforesaid literature converge to a common point that sixty plus elderly both men and women continue to work for wage and salary. Nonetheless the available literature on assessment of occupation and earning of elderly in India is scanty and inconclusive on questions concerning identification of advantageous and disadvantageous traits of elderly including short term and long term morbidities, living arrangement, household economic status and educational attainment that promote or discourage continuation of working and questions on intensity of participation in terms of number of days gainfully employed in a year. Traditionally elderly live with children for support but is changing now as evident from the fact that the proportion of 60 plus living either alone or with spouse has increase from 9 to 19% during 1992–2006 (Sathyanarayana et al. 2012). This is couple with increasing elderly headship rate (Dhillon et al. 2016) and limited credit and financial market (Pal 2006). Under this pretext some have hypothesised that elderly have no option but to work and support themselves, Singh and Das (2015). However the evidences are again scanty. The main thrust of this paper is to fill this research gap and produce pragmatic policy inputs for promotion of longer engagement of elderly in economic activities rather than recommending for universal social security coverage which is hard to realise considering the massive elderly population in India.

The specific objectives of this paper are to assess the extent of work participation by elderly, occupational profile of elderly, average working days in a year and average annual earning. The other accompanying objectives are to further assess the gender gap in earning of elderly and to examine factors which accounts for the change in earning over time. The study proposed to test two hypotheses first the work participation of elderly female has improve and second the gender gap in annual earning has reduce over time.

Data and Methods

Data

The unit level data from two rounds of India Human Development Survey-I (2004–05) and India Human Development Survey-II (2011–12) [henceforth IHDS-I and IHDS-II] are being used for this study. The University of Maryland and the National Council of Applied Economic Research (NCAER, India) carried out both the surveys covering all states and union territories in India for nationally representative households and individuals. Similar survey design and instruments were used in the two rounds of IHDS and the number of elderly 60 years and above interviewed in IHDS-I and IHDS-II are 17,904 and 21,926 respectively. The information collected at the household level includes basic amenities, assets, household income with source, demographic particulars of household members and that at the individual level includes age, sex, marital

status, income employment, health, and different aspects of gender and family rela-
tionships from both male and female respondents. Details of India Human Develop-
ment Survey can be found in Desai et al. (2010).

Definition of Variables

Primary activity status is use to classified an individual as earner if reported to be currently
engaged in any economically productive activity andclassified as non-earner if reported as
unemployed, housewife/household work, student and unfit to work. Earneragain based on
primary activity status is further categorized into agricultural worker, labourer, business,
salaried and professional and part time worker. Annual earnings from all economic
activities excluding in kind received is treated as income of individuals in the analysis
and the reported income of IHDS-I is adjusted for inflation to price of 2011–12 so as to
make income in IHDS-I (2004–05) and IHDS-II (2011–12) comparable. Annual earning
of elderly 60 years and above is the independent variable in this analysis as annual income
smooth out seasonal variation and represents more stable income.

In the analysis of earning of elderly and gender gap in earning the important control
variables included are place of residence, household income quintiles, living arrange-
ment, age categorized into broad groups 60–64, 65–69, 70–74 and 75+ years, literacy
status dichotomized as non-literate and literate, number of working days in the last one
year, not having any short term morbidities and suffered from diarrhoea, fever and
cough in the last 15 days, not suffered from long term morbidities and suffering from
communicable diseases, non-communicable diseases and other diseases and disabilities
in the last one year.

Intergenerational co-residence is a critical social institution for the security of the
elderly (Kochar 1999) and adult children benefit from their parent's assets, particularly
housing and accumulated wealth (Da Vanzo and Chan 1994). Justification in traditional
societies, other than social bonding, includes altruism of family members and return to
parental investment in the caring and education of young children (Lillard and Willis
1997). Economic dependency of elderly living with spouse is much lower than those in
other type of living arrangement (Ladusingh 2013a, b). The living arrangement is
conceptualized on similar lines from multigenerational perspective to capture familial
support system. Elderly staying alone or with spouse is classified as one generation
household, elderly with or without spouse staying with children is classified as two
generations household and elderly with or without spouse and staying with children
and parents is classified as three generations household.

Statistical Analysis

For assessment of household and individual level factors enhancing work for wage and
salary a logit model is adopted considering the dichotomous dependent variable y
coded 1 for earner and 0 otherwise. The model specification is as follows:

$$\text{logit}(P_i) = \beta_0 + \sum_i \beta_i x_i + \varepsilon_i$$

where $P_i =$ Prob$[y_i =1]$ and β_i s are the coefficients of control variables x_i outline in the preceding section and ε_i is the error term.

The annual earning is model as

$$y = \sum \beta_i^g X_i^g + \varepsilon$$

where y is the annual earning in log scale, X_i^g denoting the covariates of gth group where g = (M, F), M and F stands for male and female respectively. Then Blinder (1973) -Oaxaca (1973) decomposition of gender difference in the mean annual earning $\overline{ED}^g$ can be express as

$$\overline{ED^M} - \overline{ED^F} = \left(\overline{X^M} - \overline{X^F}\right)\beta^F + \overline{X^F}\left(\beta^M - \beta^F\right) + \left(\overline{X^M} - \overline{X^F}\right)\left(\beta^M - \beta^M\right)$$

$$= E + C + I$$

where

$$E = \left[E_\beta^F\left(Y_i^M|X_i^M\right) - E_\beta^F\left(Y_i^F|X_i^F\right)\right]$$

$$C = \left[E_\beta^M\left(Y_i^F|X_i^F\right) - E_\beta^F\left(Y_i^F|X_i^F\right)\right]$$

and

$$I = \left[E_\beta^M\left(Y_i^M|X_i^M\right) - E_\beta^F\left(Y_i^M|X_i^M\right)\right] + \left[E_\beta^M\left(Y_i^F|X_i^F\right) - E_\beta^F\left(Y_i^F|X_i^F\right)\right]$$

In the decomposition E is the endowment factor, that is, the gap in annual earnings that would be close if females have the same endowment as that of males, C is the gap that would be close if females had the same coefficients as that of males and I is the contribution of interaction, that is, due to simultaneous variation of endowments and coefficients.

Results

The characteristics of elderly 60 years and above by status of earning at two points of time 2004–05 and 2011–12 are shown in Table 1. The proportion of elderly engaged in economically activities has marginally increase by 3% from 13.3 to 16.4% during 2004–05 to 2011–12 but it is more pronounce in rural from 14 to 18.5% while it is stagnant in urban at about 12%.

Involvement in economically productive work among the elderly females is as low as 7.1% in 2004–05 and increase by 4% in 2011–12 but among the elderly males it is higher at 19.4% in 2004–05 which increases to 23.3% in 201–12. More elderly in poorer households work for wage and salary than among the elderly in richer households as evident from the fact that 17.6% of elderly in households in the first income

Table 1 Percent distribution of elderly by earning status and selected background in 2004–05 and 2011–12 in India

Background	2004–05			2011–12		
	Non earner	Earner	N	Non earner	Earner	N
Residence						
Rural	86.0	14.0	12,647	81.5	18.5	14,883
Urban	88.5	11.6	5257	88.0	12.0	7043
Sex						
Male	80.6	19.4	8963	76.7	23.3	10,523
Female	92.9	7.1	8941	89.9	10.1	11,403
Household quintile						
First	82.4	17.6	3584	79.6	20.4	4387
Second	81.9	18.1	3578	79.4	20.6	4386
Third	85.6	14.4	3582	81.4	18.6	4417
Fourth	89.9	10.1	3580	86.0	14.0	4353
Fifth	93.8	6.2	3580	91.4	8.6	4383
Living arrangement						
One generation	81.8	18.2	11,773	78.3	21.7	15,093
Two generations	95.5	4.5	333	92.7	7.3	424
Three generations	96.3	3.7	5798	95.4	4.6	6409
Age						
60–64	79.8	20.2	6295	74.0	26.0	7245
65–69	86.3	13.7	4622	81.5	18.6	5682
70–74	90.6	9.4	3486	89.2	10.8	4059
75+	96.0	4.0	3501	95.5	4.6	4940
Education						
Illiterate	86.0	14.0	10,983	82.7	17.3	12,594
Literate	87.9	12.1	6921	84.7	15.3	9332
Total	86.7	13.3	17,904	83.6	16.4	21,926

quintile were earners in 2004–05 as compared to 6.2% of elderly in the fifth income quintile. The corresponding figures in 2011–12 are 20.4 and 8.6% respectively. Among those living in one generation where the elderly is staying either alone or with spouse but without children, 18.2% were earners in 2004–05 and increases to 21.7% in 2011–12 and corresponding figures for the two time points among those in two generations households where the elderly are staying with children and three generations households where elderly stays with children and parents are 4.5 and 7.3% and 3.7 and 4.6% respectively. Though the elderly earners have increase over the years, more elderly in one generation households are earners than elderly in three generations households. Work participation among elderly for wage and salary dwindle with advancing age. In 2011–12, 26% of elderly in 60–64 years are earners as against 20.2% in 2004–05 and for these two time points the corresponding earners among those in 65–69, 70–74 and 75 plus are 18.6, 10.8, and 4.6% and 13.7, 9.4 and 4% respectively. There is differential in work participation of elderly by literacy status higher among the non-literate than among the literate. The proportion of earners among the non-literate and the literate

elderly are 14 and 12.1% in 2004–05 which corresponds to 17.3 and 15.3% respectively in 2011–12.

A clear rural-urban divide in occupation pattern of elderly in India is notice from Fig. 1. In 2004–05 65.3 and 23% of female elderly earners in rural were engaged as labourers and farmers as against the corresponding figures of 54.1 and 2.3% among their urban counterpart. There is no significant gender difference in the occupation pattern of elderly with 57.5 and 23.4% of rural male earners in rural were found working as labourers and farmers the respective among urban male earners were 42.2 and 1.5% respectively. Among the elderly earners, salaried and professional workerswere more in urban than in rural and more among the males than among the females, constituting 34 and 7.9% of male and female earners in urban while the corresponding figures in rural were 21.1 and 3.2% respectively. Among the male earners 15 and 7.2% in urban and rural areas were doing business while among the females the respective figures are 12 and 4.2% respectively. Engagement in part time work was marginally higher among the females than among the males regardless of place of residence. There is remarkable change in the occupational structure of elderly earners during 2004–2012, female earners involved in part time work has escalated from 4.4 to 34.3% in rural and from 10.5 to 25.3% in urban and this has resulted in the decline in working in agricultural and animal farmers from 23 to 8.6% in rural and from 2.3 to 0.4% in urban. Female earners involved in business too has decline from 12.3 to 1.3% in urban and from 4.2 to 1.3% in rural. Among the male in urban areas the only noticeable change in
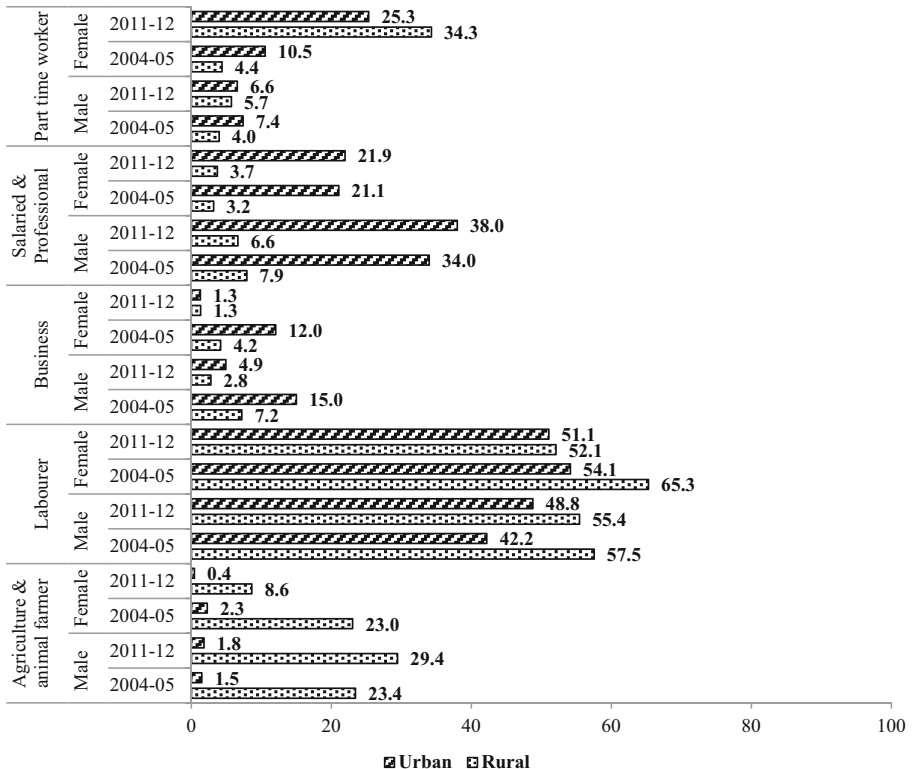

Fig. 1 Changing occupation pattern of elderly in India during 2004–05 to 2011–12

occupational structure during 2004–2012 is that salaried and professional earners has increase from 34 to 38%, labourers from 42 to 48.8% and involvement in business has decline from 15 to 4.9%. On the other hand among the male in rural engagement in business has decline marginally from 7.2 to 2.8% and working as labourer declines from 57.5 to 55.4% while working as agricultural and animal farmers has increase from 23.4 to 29.4%. As expected more non-literate and those poorer households as measure by household income quintile than literate and then those in richer households elderly were working as labourer and have not change during 2004–2012.

Average number of working days in the last one year and inflation adjusted average annual income of elderly 60 years and above by selected background are shown in Table 2 for 2004–05 and 2011–12. Annual income is considered as it is more stable than the weekly or monthly income and also it smooth out the seasonal variation. Urban and male elderly earned annually Rs. 55,635 and Rs. 30,120 respectively as against Rs. 18,203 and Rs. 13,780 for rural and female elderly in 2004–05 and corresponding figures are Rs. Rs. 69,834 and Rs. 38,713 respectively and Rs. 21,378 and Rs. 16,230 respectively in 2011–12. Thus significant rural-urban and gender differentials in average working days and mean annual income of elderly earners are notice, earning of elderly in urban and male elderly is nearly three times than those of elderly in rural and their female counterpart and the magnitude of differentials are true both in 2004–05 and 2011–12. Average number of working days in urban has increase from 250 to 259 but reduce from 162 to 143 in rural during 2004–2012 and during this period mean working days for male has decline from 186 to 180 and for female from 164 to 142 days. As expected the average working days in a year and mean annual income concomitantly increases with household income quintile. No consistent pattern of association living arrangement and advancing age of elderly with working days and annual income can be notice and it is invariant of time. Literate elderly work more days and earn more in a year on the average than the non-literate, the gap in mean annual income of literate elderly is Rs. 45,298 in 2004–05 and Rs. 51,953 in 2011–12 which are nearly three times of Rs. 15,923 and Rs. 19,582 for non-literate in 2004–05 and 2011–12 respectively. A wide inequity is notice in the mean annual income by occupation of elderly with highest earning of Rs. 85,539 by salaried and professional workers in 2004–05 which escalates to Rs. 107,506 in 2011–12. Average annual earning is the lowest for agricultural and animal farmers and even slides down from Rs. 12,977 to Rs. 10,479 during 2004–2012. Though elderly engaging in part time jobs particularly among the females has increase considerably the productivity in terms of average annual income has decline from Rs. 33,334 in 2004–05 to Rs. 20,227 in 2011–12. On the whole the mean annual income of elderly in India has enhanced from Rs. 30,435 in 2004–05 to Rs. 33,983 in 2011–12.

The likelihood of elderly to be an earner in terms of odds ratios by selected background characteristics are shown in Table 3. In 2004–05 the odds of urban elderly being engaged as an earner adjusting for background was 23% higher than that of their rural counterparts and significant at $P < 0.05$ but rural-urban differential is no more statistically significant in 2011–12. Elderly in wealthier households are less likely to be engaged as an earner. As compared to elderly from households in the lowest income quintile adjusting for other factors those from household in the fourth and the fifth income quintiles were 35 and 67% less likely to be earners in 2004–05 were statistically significant at $P < 0.01$. Though similar is the situation in 2011–12 only the adjusted

Table 2 Average working days and mean annual income of elderly in 2004–05 and 2011–12 by selected background in India

	2004–05		2011–12	
	Working days	Annual earning (in Rs.)	Working days	Annual earning (in Rs.)
Residence				
Rural	162	18,203	143	21,378
Urban	250	55,635	259	69,834
Sex				
Male	186	30,120	180	38,713
Female	164	13,870	142	16,230
Household quintile				
First	137	9074	105	9088
Second	167	15,680	147	15,873
Third	186	20,684	171	21,818
Fourth	228	39,980	208	39,732
Fifth	280	117,954	248	106,939
Living arrangement				
One generation	181	26,948	173	34,117
Two generations	184	21,438	195	46,596
Three generations	170	15,044	145	18,286
Age				
60–64	178	26,619	178	37,809
65–69	182	24,742	167	26,693
70–74	183	24,520	142	24,577
75+	188	26,351	161	29,234
Education				
Illiterate	165	15,923	151	19,582
Literate	210	45,298	197	51,953
Occupation				
Agriculture & animal farmer	118	12,977	84	10,479
Labourer	176	17,649	178	26,014
Business	207	27,193	174	29,242
Salaried & professional	276	85,539	320	107,506
Part time worker	199	33,334	118	20,227
Overall	186	30,435	172	33,983

differential in the odds of being earner by elderly from the fifth income quintile household lower by 40% from those of elderly from the lowest income quintile remain significant at $P < 0.01$. Elderly who lives in two and three generations households are also found to be less likely to engaged as earner as compared to elderly from one generation households. Adjusting for other background the odds of elderly in two and three generations households to be earner were 72 and 76% lower than those in one generation households in 2004–05 and 56 and 62% lower in 2011–12. The differentials are significant at $P < 0.01$. With advancing age elderly tends to disassociate themselves from earning. When other background characteristics are controlled the odds of elderly

Table 3 Odds ratios of being engaged in economic activities by elderly in 2004–05 and 2011–12 in India

	2004–05			2011–12		
	Odds ratios	Standard error	P > z	Odds ratios	Standard error	P > z
Constant	0.82	0.07	0.027	0.94	0.09	0.505
Residence						
Rural ®						
Urban	1.23[**]	0.09	0.004	0.90	0.06	0.114
Household quintile						
First quintile ®						
Second quintile	1.09	0.10	0.338	1.08	0.10	0.428
Third quintile	0.89	0.09	0.225	1.08	0.10	0.390
Fourth quintile	0.65[***]	0.08	0.001	0.85	0.08	0.084
Fifth quintile	0.33[***]	0.04	0.000	0.60[***]	0.07	0.000
Living arrangement						
One generation ®						
Two generations	0.28[***]	0.09	0.000	0.44[***]	0.11	0.001
Three generations	0.26[***]	0.03	0.000	0.38[***]	0.04	0.000
Age						
60–64 ®						
65–69	0.56[***]	0.05	0.000	0.64[***]	0.04	0.000
70–74	0.40[***]	0.04	0.000	0.37[***]	0.04	0.000
75+	0.18[***]	0.03	0.000	0.14[***]	0.02	0.000
Long term morbidity						
No disease ®						
Communicable disease	1.18	0.50	0.700	0.88	0.28	0.696
Non communicable disease	0.75	0.40	0.587	0.61[***]	0.05	0.000
Other disease and disability	0.53	0.21	0.102	0.67[***]	0.06	0.000
Short term morbidity						
No disease®						
Diarrhea	0.79	0.24	0.439	1.18	0.37	0.603
Fever	1.78[**]	0.38	0.006	1.70[***]	0.23	0.000
Cough	1.07	0.12	0.555	1.18	0.11	0.071
Education						
Illiterate ®						
Literate	0.52[***]	0.04	0.000	0.54[***]	0.04	0.000
Sex						
Male®						
Female	0.30[***]	0.02	0.000	0.29[***]	0.02	0.000

®, Reference category

* P < 0.05, ** P < 0.01, *** P < 0.001

in 65–69, 70–74 and 75+ years to be engaged as earner were 46, 60 and 72% lower in 2004–05 in comparison to those in 60–64 years and are statistically significant at $P < 0.01$. The same is true for 2011–12 with marginal difference in the level of odds ratios. Morbidity among the elderly particularly long term morbidities has deterrent effect on engagement as earner and has profound significance in 2011–12. Elderly suffering from non-communicable diseases and from other diseases and having disability are 39 and 33% less likely to be engaged as earner in comparison to elderly free from morbidities. The differentials are statistically significant at P < 0.01. On the other hand elderly suffering from short term morbidities do not seem to have assertive effect on being earner. The likelihood of literate elderly to be earner is lower than that of non-literate elderly was lower by 48% in 2004–05 and by 46% in 2011–12 when other characteristics are controlled and statistically significant at P < 0.01. There exits considerable gender differential in participation in economic activities as the odds of females' engagement as earner is 70% lower to that of males and the gender gap is highly significant. The emerging message as far as the involvement of elderly in economic activities for earning is concerned is that elderly from poorer households, living alone or with spouse in one generation households, just retired and are in 60–64 years, elderly who are free from long term morbidities, non-literate elderly and males are more likely to be engaging as earner than their counterparts from richer households, living in two and three generations households, in advancing age, suffering from long term morbidities, are literate and females.

To assess to what extent the characteristics of elderly which induce engagement as earner contributes to income differential regression of annual income in log scale on the aforesaid characteristics were implemented separately for males and females are results are shown in Table 4.

Gender differential in annual income is evident from the results of regression for pooled data. When the effect of other background of elderly are controlledthe annual income of female is about 30% lower [exp(−0.37) = 0.69 and exp.(−0.39) = 0.68] than that of male and statistically significant at $P < 0.01$. Rural-urban gap among males controlling for other characteristics indicates annual income of urban elderly to be nearly 1.2 times [exp (0.18) =1.20 and exp. (0.17) =1.17] than that of rural elderly and significant at P < 0.01. However among females urban-rural differential is not significant. Adjusting for other factors annual income of elderly from households in higher income quintiles are higher than that of elderly from lower income quintiles and the differential by household income quintiles is more pronounce among females. In 2004–05 among males the adjusted annual income of elderly in the second household income quintile is 1.3 times than those of elderly in the lowest household income quintile and escalates to 3.4 times for elderly in the fifth household income quintile and straddling differentials are significant at $P < 0.01$. Among the females also similar differential and significance pattern holds well but the magnitude of differential are marginally higher. In 2011–12 as well adjusted annual income of elderly from higher household income quintiles are much higher in comparison to that of elderly from lowest household income quintile and the statistical significance of the differentials also holds good but the magnitude of differential is reduced. In comparison to elderly in one generation households by themselves or with spouse the annual income of those living in two generations households with children and in three generations households with children and other family members are lower. The annual income of elderly males and females

Table 4 Determinants of gender gap in annual income of elderly in India during 2004–2012

| | 2004–05 | | | | 2011–12 | | | |
| | Male | | Female | | Male | | Female | |
	β	SE(β)	β	SE(β)	β	SE(β)	β	SE(β)
Constant	7.99***	0.07	7.57***	0.10	7.85***	0.07	7.72***	0.11
Residence								
Rural ®								
Urban	0.18***	0.04	0.10	0.07	0.17***	0.05	0.02	0.09
Household quintile								
First quintile ®								
Second quintile	0.29***	0.06	0.33***	0.06	0.22***	0.06	0.13	0.07
Third quintile	0.41***	0.06	0.37***	0.07	0.29***	0.07	0.25**	0.08
Fourth quintile	0.69***	0.07	0.72***	0.09	0.55***	0.07	0.51***	0.09
Fifth quintile	1.21***	0.09	1.37***	0.18	0.88***	0.11	0.72**	0.23
Living arrangement								
One generation ®								
Two generations	−0.33*	0.15	−0.01	0.17	0.14	0.29	−0.10	0.11
Three generations	−0.27***	0.06	−0.31***	0.06	−0.07	0.09	−0.21**	0.07
Age								
60–64 ®								
65–69	−0.04	0.04	−0.01	0.05	−0.04	0.04	−0.01	0.07
70–74	−0.15**	0.06	0.16*	0.07	−0.15	0.07	−0.06	0.09
75+	−0.04	0.07	0.42***	0.11	−0.08	0.07	0.12	0.18
Long term morbidity								
No disease ®								
Communicable disease	0.16	0.27	0.89***	0.09	0.13	0.16	0.23	0.09
Non communicable disease	0.04	0.15	0.18	0.14	0.12	0.06	0.11	0.10
Other disease and disability	0.40	0.22	−0.87***	0.10	0.09	0.05	−0.13	0.10
Short term morbidity								
No disease ®								
Diarrhea	−0.27	0.18	0.03	0.17	0.29	0.16	0.08	0.23
Fever	−0.02	0.12	−0.14	0.09	0.05	0.10	0.01	0.10
Cough	0.24***	0.06	−0.14	0.08	−0.11	0.06	0.00	0.06
Occupation								
Cultivation ®								
Labourer	0.18***	0.05	0.31***	0.07	0.29***	0.06	0.21	0.11
Business	0.16*	0.08	−0.07	0.10	0.03	0.15	−0.04	0.18
Salaried & profession	0.43***	0.08	0.25	0.15	0.11	0.11	0.10	0.20
Retired & nothing	0.14	0.10	0.03	0.14	−0.03	0.09	−0.02	0.11
Working days	0.01***	0.00	0.01***	0.00	0.01***	0.00	0.01***	0.00

®, Reference category

* P < 0.05, ** P < 0.01, *** P < 0.001

living in three generations households were 24 and 27% lower that their counterparts living in one generation households in 2004–05 and the differentials have shown

significant at $P < 0.01$. However the income gap of elderly living in one generation and either in two or three generations has reduce in 2011–12 and the gap between elderly females in three generations households down by 19% in comparison to females in one generation households is significant at $P < 0.05$. The adjusted association between advancing age and annual income of elderly among males and females is not uniform while it decreases with age among males it is other way among females. In 2004–05 the annual income of males in 65–69 years were 14% lesser than those of 60–64 years old and significant at $P < 0.05$, while annual income of females in 75 plus were 1.5 timesmore than that of 60–64 years and significant at $P < 0.01$. Though similar pattern of association between advancing age of elderly males and females is true in 2011–12, the gap in income by age is no longer statistically significant. In 2004–05 among males suffering from long term morbidity did not show significant effect on income but among females it was notice that controlling for other background in comparison to elderly with no disease the annual income of those suffering from disability and other diseases was 52% lower while was 2.4 times higher for females suffering from communicable diseases and both were significant at $P < 0.01$. No distinct pattern of adjusted effect of short term morbidities on annual income among elderly males and females were evident in 2004–05. This is further complemented by the finding that in 2011–12 morbidities do not show any significant effect on the adjusted annual income elderly males and females. Elderly in agricultural and farming occupation have the lowest adjusted annual income. Annual income of males and females labourers in the year 2004–05 controlling for other factors are 1.2 and 1.4 times than that their counterpart agricultural and animal farmers, while that of salaried and professional males was 1.5 times than that of male agricultural and animal farmers. These were significant at $P < 0.01$. Occupational differential in annual income of elderly has weakened over time and is no longer significant in 2011–12. With a day increase in working days regardless of sex and time the adjusted annual income of elderly increases marginally by 1 % and found to be statistically significant at $P < 0.01$.

The results of Oaxaca-Blinder decomposition of gender gap in annual income over time are shown in Table 5. The discriminatory effect, that is, $\bar{X}^F \left(\beta^M - \beta^F \right) = 0.3778$ in 2004–05 make up 54.5% of the gender gap in annual income and it arises as males were paid competitive wages whereas females were underpaid. In 2011–12 the discriminatory effect is 0.3841 which accounts for 47.6% of the gender gap in annual income.

Endowment effects, that is, $\left(\bar{X}^M - \bar{X}^F \right) \beta^F$ captures male-female gap in annual income due to differences in their characteristics and it constitutes 48.7 and 51.7% of the gender gap in annual income in 2004–05 and 2011–12 respectively. The contribution of interaction of endowment and discriminatory effects on gender gap in annual income is negligible, while in 2004–05 it lowers the gap by 3.2% and accounts for less than a percent in 2011–12.

Summary and Conclusions

The paper is an attempt to provide policy inputs for promotion of economic activities of elderly in India under the premise of evolving and limited social security and fading social support system. Empirical evidence from this study unfolds that among the elderly in 60

Table 5 Decomposition of gender gap in annual income of elderly in 2004–05 and 2011–12

Decomposition components	2004–05	2011–12
Gap in annual income (in log scale)	0.6933	0.8062
Endowments effect	0.3377	0.4169
Discrimination effect	0.3778	0.3841
Interaction effect	−0.0222	0.0052

plus wage labour participation of females is much lower than their male counterpart and the gap persist over time. Selvaraj et al. (2011) also found similar level of male-female wage gap. It is indicative of the fact that males are paid competitive wage while females are discriminated in the labour market. Emergence of women centric jobs and opening of traditionally male dominated industries to female is expected to gradually evaporate the discrimination of females in the labour market. Work participation rates of elderly from rural, poorer households and of those living in fewer member households are more than those from urban, richer households and multigenerational households. These conclusions corroborate with the findings of Singh and Das (2015)and the authors inferred as out of compulsion in the absence of comprehensive social security and weakening of social support system. Under the circumstances skill enhancement is the key for higher wage return of elderly from rural, poor and multigenerational households. Such an effort can provide sustainable means to ensure the welfare of elderly in the long run. In concordance with Reddy (2016), Selvaraj et al. (2011), Singh and Das (2015), and Dhillon and Ladusingh (2013) elderly work participation is found dwindling with advancing age. It is but natural, however such empirical evidence can also be consider as readiness and availability of manpower beyond the age of retirement. Though Uppal and Sarma (2007) had found that chronic illnesses and disabilities negatively impact labour market participation, the recent trend emerging from the present study is that the effect of health on annual income of elderly seems to be no more significant when other background characteristics are adjusted. Among all occupations annual income of elderly in agriculture and animal farming is the least and those of salaried and professional is the highest. Number of days on work adjusting for other factors is found to have positive significant effect on mean annual income of elderly and seasonal occupations mainly in agricultural and animal farming thus have lower income as compared to other to those in other occupations.

The policy implications of the findings are first there is feasibility of enhancing work participation of elderly well past 60 years, secondly higher monetary return to work by elderly can be a reality by upgrading skill which suits the emerging labor market can increase and thirdly adequate financial support to self employed and own account enterprises. As a policy to create job market proportionate tax incentives can be considered for business houses employing elderly workers.

Compliance with Ethical Standards

Conflict of Interest The authors declare that there is no conflict of interest.

Informed Consent Since the study is based on secondary data informed consent is not obtained from individual participants in the study.

Ethical Treatment of Experimental Subjects (Animal and Human)   This article does not contain any studies with human participants performed by any of the authors.

Ethical Statement   The study is based on publicly available data and no ethical issues are involved.

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