Who works at older ages? the correlates of economic activity and temporal changes in their effects: evidences from India

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Who works at older ages? The correlates of economic activity and temporal changes in their effects: Evidences from India

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abstract

India is an ageing population. A large informal sector provides ample scope to absorb human resources even at older ages. Therefore, like other developing countries a large proportion of older adults in India lead an economically active life. The present study investigates the association of various factors namely, gender, household per capita monthly expenditure, place of residence, education, marital status, age etc. with the state of being economically active. For this purpose three nationally representative samples that were collected as a part of the national sample survey (NSS) are utilized. These samples represent the older adult population of India during the periods 1986-87, 1995-96 and 2004. The logistic regression models are then applied to estimate the effects of all these factors. These effects are analyzed and changes in these effects are compared over time points. In a nutshell the states of the variables that are conducive to being economically active are being male, residing in rural areas and lower educational levels. Ill health on the other hand adversely affects the probability of being economically active. The study emphasizes the need for taking care of the health needs of the older adults to help them remain active for longer duration.

Keywords: ageing, economic activity, older adults

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Introduction

Economically productive life span of an individual ends with his/her age at retirement. The official age at retirement varies from one society to the other. In developing countries, the official age at retirement ranges from 55 years to 60 years (Dinesh and Rayappa, 1983). In India, the demarcation line to distinguish the older adults from the rest of the population for formulating and implementing welfare schemes ranges from 55 years to 74 years (Irudaya Rajan, 2007). Various surveys and studies about the older adults, however, consider 60 years as a demarcation line.

Granting that ageing starts at 60 years, it has been already established that Indian population has started ageing. In simple terms, it means that the proportion of the older adults in the population of India has started increasing over time (Irudaya Rajan et al., 1999). Accompanying this increase, the old-age dependency ratio is also increasing (Irudaya Rajan et al., 1999). Thus, concern over the state of well being of the older adults is also increasing. The pivotal question is who will take care of the well being of older adults when the number of care takers, in particular, the younger members in the population dwindles? In such a scenario, countries like India where younger members in a family traditionally provide a sort of socioeconomic security to the older adults are likely to experience an acute situation.

Among several aspects that determine the state of well being of an older adult, the economic aspect is very important. The ultimate concern is basically to enable the older adults to remain economically independent. One possible alternative for achieving it is through public/familial transfers towards the older adults. It is also possible through the economic activities that mitigate the economic dependence. There could also be a judicious combination of both the alternatives. For more than a decade in India, the former alternative is already in place in the form of the national old age pension scheme for poor older adults (Irudaya Rajan, 2007).

Working at older ages may not be at par with working at younger ages in the remunerative sense. Moreover, it is quite possible that the older adults either work willingly or they are forced to work for monetary benefits (Dinesh and Rayappa, 1983). India, like other developing countries, has a large agricultural sector. This sector can absorb and sustain human resources at older ages unlike the manufacturing and the service sectors that require skilled work force. Thus we find in this

sector of India a large proportion of economically active older adults. This situation is akin to what is observed in developing countries in general (Nasir and Ali, 2000; Chen and Jones, 1989; Choe, 1989; Perara, 1989). An older adult is free to drop himself/herself from economic activity or continue with it. Question arises about the factors that help or deter continuing with economic activity by older adults. Answering this question is essential if remaining economically active is indicative of a state of well being for the older adults. That economically active older adults are more favorably treated by their family members is well-recognized phenomenon in day-to-day life (Yadava et al. 1996).

This issue has also been addressed by Audinarayana (2001) in a study based on a sample of older adults from three districts of Tamilnadu in India and by Nasir and Ali (2000) for a sample of older adults in Pakistan. Uppal and Sarma (2007) investigated the role of chronic illness and diseases on the labor market activity of older adults in India. A host of factors including education, the marital status, the living arrangements and the gender were found to be associated with economic activity of older ages. For related literature in the Indian context D'Souza (1989), Devi (1983), Devi and Audinarayana (1984), Devi (1992) and Pethe (1982) may be referred. The present study addresses the issue in a countrywide perspective based on three nationally representative samples, collected in 1986-87, 1995-96 and 2004 and also finds out the changes in the effects of various factors over time.

Conceptual framework, data and methods

The 42nd (1986-87), the 52nd (1995-96) and the 60th (2004) rounds of the National Sample Survey (NSS) provide rich qualitative and quantitative information on the health and the socioeconomic aspects of the older adults in India. Indeed, the data from these rounds are unique in terms of the nationwide coverage of the older adults in India. The sizes of the sample in the three rounds have been 56071, 28543 and 29102 respectively.

The information pertaining to the economic aspects of the households includes the details of monthly expenditure, the principal economic activity and the principal occupation of the household during the reference period. The information on economic aspects of older adults includes his/her state of economic dependency, his/her principal economic activity during the

reference period and the industry and the occupation he/she is engaged with. The referred period for all these surveys has been a year prior to the date of survey of an older adult. Hereafter, the reference periods corresponding to the 42^{nd} (1986-87), 52^{nd} (1995-96) and the 60^{th} (2004) rounds shall be called the first, the second and the third reference periods, symbolized respectively by r_1, r_2 and r_3. The present study ignores the variation in the reference period during a round. The 42^{nd} and the 52^{nd} rounds of the NSS also provided information on the past economic activities and the details of retirement for the older adults who were not economically active during the reference period. We also have information on the outstanding loan of an economically independent older adult and the possession and management of property and assets by him/her (42^{nd} and 52^{nd} rounds only).

The probability that an older adult will be economically active is associated with a host of variables. Poor household economic conditions may force an older adult into economic activities. His /her individual economic condition is another factor that may keep him economically active at older ages. For example, having assets/property may provide him a scope to continue with economic activities at older ages. Education can help him/her in either way. It can help him/her to earn for a longer duration or the highly educated ones may be involved in such professions during their prime economic activity span that they do not feel any need to continue with the economic activities at the older ages. Further, there is a high chance that males remain economically active for longer duration due to their socially advantageous position in the Indian society. Rural areas, due to the predominance of the informal sector, may provide a greater scope to absorb older adults when compared to the urban areas. The marital status and the living arrangements of the older adults are other such variables that may be associated with the economic activities of the older adults.

Ill health is detrimental to remaining economically active. The ill health at older ages may be more due to chronic morbidity than the acute ones. Impairment and immobility also hamper the health of older adults. Thus, the role of ill health in making the older adults unable to continue with their economic activities is a matter of concern. Therefore, in addition to the socioeconomic and cultural variables, the conceptual framework incorporates few objective as well as subjective variables for measuring different aspects of health. The objective variables are the level of immobility, the number of chronic diseases and the number of impairments. The subjective indicator of health is the self-perceived health.

Suppose we have a binary response, Y (remaining economically active at older ages or otherwise), coded 1 if economically active and 0 otherwise. Let $\mathbf{X} = (x_1, x_2 ... x_k)$ be a vector of *k* explanatory variables that influence Y. Letting, $\pi_t(\mathbf{X})$ denote the probability of remaining economically active given **X** during the reference period t, i.e.

$$\mathrm{P}_t(Y = 1/\mathbf{X}) = \pi_t(\mathbf{X})$$

The logistic regression model that links this probability to the explanatory variables is given as

$$\pi_t(\mathbf{X}) = \frac{e^{X'\boldsymbol{\beta}_t}}{1 + e^{\mathbf{X}'\boldsymbol{\beta}_t}}$$

where, $\boldsymbol{\beta}_t$ denotes the vector of effects during the reference period *t* corresponding to the respective explanatory variables. There are three such models for t=1, 2 and 3 corresponding to the first, the second and the third reference periods respectively.

The change in the value of an effect over time can be assessed and tested assuming the independence of samples and asymptotic normality of the maximum likelihood estimates.

Findings

The effects for various reference periods are shown in the Table-1 and the changed in the effects over reference periods are shown in the Table-2. The gender scenario of the older adult work force has been found predominated by the older males. The model estimate that the older males are likely to be 7.45 times, 6.27 times and 9.30 times more economically active than the older females during the first, the second and the third reference periods respectively (Table-1). The relative effect of the male category has been the highest during the third reference period and the minimum in the second reference period. Decline in economic activity of the older adults with increasing age is expected in reality. We notice here that with unit increase in age the likelihood of being economically active gets reduced by 0.91 times, 0.92 times and 0.90 times during the three reference periods respectively. The effect of the age increased significantly from the first to the second reference period but it decreased significantly from the second to the third reference period. This effect was least during the third reference period indicating that the fall in the economic activity with age was steepest during the third reference period.

Increasing age is likely to bring about a change in the marital status. This might bring about a change in the probability of remaining economically active at older ages .It is noticed from table that the widows/widowers and others are 0.74 times less likely to be economically active than their married counterparts during the first reference period. The effect has changed significantly in the subsequent reference periods, making them 1.68 times and 1.36 times more likely to be economically active during the second and the third reference periods respectively.

An increase in the number of chronic diseases by one is found to reduce the likelihood of remaining economically active by 0.77 times, 0.93 times and 0.78 times during the first, the second and the third reference periods respectively. Similarly, an increase in the number of impairment by one reduces the likelihood of remaining economically active by 0.85 times and 0.78 times during the second and the third reference periods respectively. The effect of partial immobility too has been serious, reducing the likelihood of remaining economically active by 0.41 times, 0.25 times and 0.13 times during the respective reference periods. The detrimental effect of this factor has increased in strength over the three reference periods. The effect of severe immobility too has been similar, reducing the likelihood of remaining economically active by 0.25 times, 0.71 times and 0.17 times during the three reference periods respectively. Like objective measures of health, the self-perceived health also influences the probability of remaining economically active. In comparison to the older adults who have reported excellent/very good health, the likelihood of remaining economically active for older adults with good/fair health is reduced by 0.65 times and 0.32 times for the second and the third reference periods respectively. This effect has become more detrimental from the second reference period to the third reference period. Corresponding estimates for the older adults with poor health have been 0.29 and 0.63 for the second and the third reference periods respectively.

With an increase of one unit in the PCME, the likelihood of remaining economically active is reduced by 0.79 times, 0.68 times and 0.85 times respectively in the three reference periods. This indicates that an older adult contributes to the financial resources of his/her household through his/her economic activities when there is scarcity of such resources. This effect had a minimum value during the second reference period.

The older adults who are not having any assets are found 0.69 times and 0.80 times less likely to be economically active in the first and the second reference periods respectively when compared with the older adults who have been possessing and managing their assets. Again, the older adults

who have been possessing assets but not managing it are found 0.53 times and 0.86 times less likely to be economically active in the first and the second reference periods respectively when compared with the older adults who have been possessing and managing their assets. The results are similar for the older adults who are not having property and who are having property but not managing it. When compared with the older adults who are having property and also managing it, the likelihood for remaining economically active has been 0.46 times and 0.24 times lesser for the ones who do not have any property during the first and the second reference periods respectively. Similarly, the likelihood has been lesser by 0.24 times and 0.15 times for the older adults having property but not managing it, in the respective reference periods.

There is an intuitive notion that education helps an older adult in sustaining economic activities for longer duration. This notion does not hold in case of Indian older adults. We have found that the illiterate older adults are more likely to be economically active than the ones who are educated up to matriculation and above. They have been 2.12 times, 3.29 times and 2.24 times more likely to remain economically active in the first, the second and the third reference periods respectively. Similarly, the older adults who have been literate and who have education below matriculation level have been 2.23 times, 2.67 times and 2.19 times more likely to remain economically active than the ones who have been educated up to matriculation and above.

The older adults in the rural areas are more likely to be economically active than their urban counterparts. Plausible reasons may be that there is more informal sector and hence no age restriction in rural areas. This effect shows an increase from the first to the second reference period. It has not, however, changed significantly in the subsequent reference period. During the reference period 2003-04, the rural older adults were 2.32 times more likely to be economically active when compared to their urban counterparts. The older adults who live alone are less likely to be economically active when compared to the co-residing older adults. Their likelihood to be economically active has been 0.34 times and 0.70 times lesser than the co-residents during the first and the second reference periods respectively. The effect, however, has not changed significantly from the second to the third reference period.

Discussion

With reference to the conceptual framework of the present study, the states of variables that are conducive to the probability of being economically active are being male, residing in rural areas and being illiterate or education below matriculation. On the other hand, increasing age, poor objectively assessed health, poor or fair/good self-perceived health and increase in the PCME of a household is detrimental to the probability of remaining economically active.

The predominance of older males in the older adult work force may be due to socio-cultural norms that regulate the participation of older females in the economic activities at all ages (Audinarayana, 2001; Devi, 1983, 1992; Shantakumar, 1994; Standing, 1978). Moreover, the finding that the rural economy is more favorable to work participation of older adults when compared to the urban economy may be attributed to the informal sector involving agriculture, fishing, hunting etc, that remains the backbone of the rural economy. This finding is not in conformity with other such study from India (Audinarayana, 2001) but is in conformity with the findings of Nasir and Ali (2000). It is worth discussing at this stage how the proportion of economically active older adults varies by age under each gender in the rural and the urban areas.

The changing pattern of the proportion of the proportion of economically active older adults by age, sex and the place of residence is shown in Figure 1, Figure 2, Figure 3 and Figure 4 for the four groups of older adults namely, the rural males (RM), the rural females (RF), the urban males (UM) and the urban females (UF) respectively. As expected there is a decline in the proportion of economically active older adults with increasing age for all the four groups of older adults and for all the reference periods. Function of the form $\mathcal{Y} = \beta_0 \cdot (\beta_1)^t$ has been used to model the proportion of economically active older adults as a function of age. Here $\mathcal{Y}$ is the proportion of economically active older adults at time t where t is the time elapsed after age 60 years. β_0 gives the general level and β_1 regulates the fall in proportion of economically active older adults. The estimates of the parameters have been shown in Table 3.

It is clear from the table that the general level is generally higher for rural males than the urban males and it has been highest in 1995-96 for both the rural and the urban males. The rates of fall have been more or less same for all the periods except that the urban rates are generally somewhat lower. Again, the general level is higher for rural females than the urban females and the difference is quite substantial 1995-96 onwards. The levels have been in general increasing or at least non-decreasing over time for both the rural and the urban areas. The rates of fall for

females have been generally lower than the rates of fall for males for all the years and in each area of residence, the rates of fall are found gradually decreasing over time.

The older adults also contribute to the financial resources of the household. In fact, they are more likely to be economically active in poorer households. This fact supports the additional worker theory (Standing, 1978) that fits well in the socioeconomic environment of a developing country. On the other hand, the states of not having assets/property and having but not managing assets/property have deterrent effect on the probability of being economically active. This finding is opposite to the intuitive perception that such older adults will have greater likelihood to remain economically active due to poorer economic status. Actually, possession of assets and/or properties induces an older adult to make use of it for further income generation. The ones who are not having assets and/or properties and the ones who are having it but not managing it are more likely to remain economically inactive at older ages.

Contrary to the findings of other such studies (Audinarayana, 2001; Shantakumar, 1994) lower educational status make older adults more active in economic activities. In fact, a high educational status helps adults to get engaged in such professions during their prime economic activity span that their life time earnings might be enough to provide economic and associated securities at their older ages. The ones who are lacking such status are somewhat underprivileged and attempt at remaining active and continue earning.

It has been noted from the NSS data that the group of widows/widowers etc is predominantly composed of older females. It is quiet plausible that there is a lack of financial security for this group and it has increased after the first reference period. This might have compelled them to get involved in some economic activities. There is also another possibility that they are becoming more and more able (through education, liberalization and empowerment) and joining jobs more and more including continuing with the jobs even at older ages. Further, it seems that the older adults living alone have lesser reasons to participate in economic activities. It is worth noting that both objective and self-rated health are strongly associated with work participation. The better the health the more is the likelihood of being economically active. It becomes clear from the last two columns of the Table 2 that the likelihood of remaining economically active in the background of various influencing factors has improved during 1986-87 to 1995-96 with majority rows showing upward arrows. However, the scenario has become rather discouraging during 1995-96 to 2004 with majority rows showing downward arrows.

Conclusion

It is quite obvious that an economic activity contributes to the financial resources at the disposal of an older adult reducing his/her economic dependence and also contributes to his/her social position in the household. But, we lack information on their productivity and their earnings from the economic activities. We also lack information on how much effective are the old age pension in India in reducing the economic dependency of the older adults. This information is desirable in the national surveys that are conducted to assess the well being of the older adults. Among the factors that show association with the work participation of the older adults, health can be controlled and regulated to the extent possible by creating older adult specific health system that will help them remain healthier and economically active for a longer duration of time.

It is clear from the above findings and discussion that female older adults are still much behind their male counterparts in remaining economically active at older ages. The situation is improving slowly as the female population is getting more and more educated, liberalized and empowered. The older adults in rural areas are found remaining more economically active over increasing ages and hence adding financial resources to their respective families while maintaining their own status of wellbeing. It has also been found that not having assets and/or properties and having but not managing assets and/or properties results in reduction in the likelihood of remaining economically active. On the other hand, the older adults with higher economic status and having higher per capita monthly expenditure are more likely to become economically inactive. Higher education status too has been found resulting in higher likelihood of becoming economically active at older ages. Finally, both poor objectively assessed health status and poor self-perceived health status result in greater likelihood of becoming economically active.

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References

Audinarayana, N., 2001. Factors affecting the work participation of elderly: an empirical investigation. Demography India, 30(1), pp. 61-72.

Chen, A. J., and Jones, G. W., 1989. Ageing in ASEAN: Its socio-economic consequences. Singapore: Institute of Southeast Asian Studies.

Choe, E. H., 1989. Population ageing in the republic of Korea. Bangkok, Thailand: Economic and Social Commission for Asia and the Pacific. (Asian Population Studies Series no. 97.)

D'Souza, Victor S., 1989. The situation of aging in India. Country Study Prepared for ESCAP, Bangkok.

Devi, D. Radha, 1983. Work participation of older persons in India: some hypotheses examined. In Srinivasan, K., and Mukerji, S. (eds), Dynamics of Population and Family Welfare, Himalaya Publishing House, Bombay, pp. 411-425.

Devi, D. Radha, and Audinarayana, N., 1984. Economic Development and Work Force Participation in India. Bombay, UPS(Mimeo).

Devi, D. Radha, 1992. Work participation of the aged in India. In Krishnan, P., and Mahadevan, K. (eds), The Elderly Population in Developed and Developing World: Policies Problems and Perspectives, B. R. Publishing Corporation, New Delhi, pp. 424-443.

Dinesh, B. Manjeshwar, and Rayappa, P. Hanumantha, 1983. The aged and their work status in rural areas. Demography India, XII(1), pp. 38-51.

Nasir, Z. M. and Ali, S. M., 2000. Labour market participation of the elderly. The Pakistan Development Review, 39(4), pp. 1075-1086.

Perera, P. D. A., 1989. Emerging issues of population ageing in Sri Lanka. Bangkok, Thailand: Economic and Social Commission for Asia and the Pacific. (Asian Population Studies Series no. 98.)

Pethe, V. P., 1982. Problems of ageing population: Issues in perception research and policy. Demography India, XI(2), pp. 183-191.

Irudaya Rajan, S., Mishra, U. S., and Sarma, P. S., 1999. India's Elderly: Burden or Challenge, New Delhi, Sage Publications.

Irudaya Rajan, S., 2007. Population ageing, health and social security in India. Discussion Paper no.3, Center for Research on Economic Inequality (CREI), Graduate School of Economics, Osaka City University.

Shantakumar, G., 1994. The aged population of Singapore. Census of Population, 1990, Monograph no. 1, Singapore National printers Ltd. Singapore.

Standing, Guy, 1978. Labour force participation and development. Geneva, ILO.

Uppal, S. and Sarma, S., 2007. Aging, health and labour market activity: The case of India. World Health and Population, 9(4), pp. 79-97.

Yadava, K. N. S., Yadava, S. S. and Sharma, C. L. N., 1996. A study of socioeconomic factors and behavioural problems of the aged persons in rural northern India. Demography India, 25(1), pp. 21-34.

Table 1: The effects of various factors on the probability of remaining economically active during three time points in India

variables	effects in various reference period			odds ratios and 95% confidence intervals for the odds ratios					
	1986-87 (p-value)	1995-96 (p-value)	2004 (p-value)	1986-87	95% C.I.	1995-96	95% C.I.	2004	95% C.I.
place of residence									
rural	**0.58(0.00)**	**0.84(0.00)**	**0.84(0.00)**	**1.79**	**(1.68, 1.91)**	**2.32**	**(2.12, 2.55)**	**2.32**	**(2.13, 2.53)**
urban®									
living arrangements (la)									
alone	**-1.09(0.00)**	**-0.35(0.00)**	**-0.38(0.00)**	**0.34**	**(0.20, 0.57)**	**0.70**	**(0.63, 0.78)**	**0.69**	**(0.63, 0.75)**
co-residence®									
household PCME	**-0.24(0.00)**	**-0.39(0.00)**	**-0.16(0.00)**	**0.79**	**(0.75, 0.84)**	**0.68**	**(0.62, 0.73)**	**0.85**	**(0.79, 0.81)**
age	**-0.10(0.00)**	**-0.08(0.00)**	**-0.10(0.00)**	**0.91**	**(0.90, 0.91)**	**0.92**	**(0.91, 0.93)**	**0.90**	**(0.90, 0.91)**
gender									
male	**2.01(0.00)**	**1.84(0.00)**	**2.23(0.00)**	**7.45**	**(6.98, 7.95)**	**6.27**	**(5.78, 6.81)**	**9.30**	**(8.64, 10.01)**
female®									
marital status									
widowed and others[1]	**-0.30(0.00)**	**0.52(0.00)**	**0.30(0.00)**	**0.74**	**(0.69, 0.80)**	**1.68**	**(1.38, 2.03)**	**1.36**	**(1.15, 1.59)**
married®									
education									
Illiterate	**0.75(0.00)**	**1.19(0.00)**	**0.81(0.00)**	**2.12**	**(1.87, 2.41)**	**3.29**	**(2.83, 3.83)**	**2.24**	**(1.98, 2.54)**
literate but below matriculation	**0.80(0.00)**	**0.98(0.00)**	**0.79(0.00)**	**2.23**	**(1.96, 2.52)**	**2.67**	**(2.31, 3.10)**	**2.19**	**(1.94, 2.48)**
matriculation and above®									
assets									
not owing	**-0.38(0.00)**	**0.23(0.00)**	×	**0.69**	**(0.65, 0.73)**	**0.80**	**(0.71, 0.89)**	×	×
owing: not managing	**-0.63(0.00)**	**0.15(0.10)**	×	**0.53**	**(0.48, 0.59)**	**0.86**	**(0.72, 1.03)**	×	×
owing: managing®									
property									
not owing	**-0.78(0.00)**	**-1.44(0.00)**	×	**0.46**	**(0.43, 0.49)**	**0.24**	**(0.21, 0.27)**	×	×
owing: not managing	**-1.44(0.00)**	**-1.92(0.00)**	×	**0.24**	**(0.22, 0.26)**	**0.15**	**(0.12, 0.17)**	×	×
owing: managing®									
immobility									
severe	**-1.40(0.00)**	**-0.34(0.08)**	**-1.75(0.00)**	**0.25**	**(0.21, 0.29)**	**0.71**	**(0.49, 1.04)**	**0.17**	**(0.10, 0.29)**
partial	**-0.88(0.00)**	**-1.37(0.00)**	**-2.04(0.00)**	**0.41**	**(0.37, 0.46)**	**0.25**	**(0.21, 0.31)**	**0.13**	**(0.10, 0.17)**
no difficulty in mobility®									
no. of chronic diseases	**-0.26(0.00)**	**-0.07(0.00)**	**-0.25(0.00)**	**0.77**	**(0.75, 0.79)**	**0.93**	**(0.90, 0.96)**	**0.78**	**(0.73, 0.83)**
no. of impairments	×	**-0.16(0.00)**	**-0.25(0.00)**	×	×	**0.85**	**(0.82, 0.88)**	**0.78**	**(0.72, 0.85)**
self-perceived health									

poor	×	-1.24(0.00)	-0.47(0.00)	×	×	0.29	(0.25, 0.34)	0.63	(0.55, 0.71)
good/fair	×	-0.43(0.00)	-1.13(0.00)	×	×	0.65	(0.58, 0.73)	0.32	(0.28, 0.37)
excellent/very good®									
intercept	5.48(0.00)	6.40(0.00)	5.56(0.00)						
Cox and Snell-R^2	0.351	0.381	0.305						

1 Others include divorced/never married/separated

× denotes that the information on the variable is not available for the respective reference period

Table 2: The change in effects of various factors on the probability of remaining economically active during three time points in India

variables	effects in various reference period			change in effects 1986-87 to 1995-96	change in effects 1995-96 to 2004	change in likelihood of remaining economically active 1986-87 to 1995-96	change in likelihood of remaining economically active 1995-96 to 2004
	1986-87	1995-96	2004				
place of residence							
rural	0.58	0.84	0.84	0.26**	0.00	↑	no significant change
urban®							
living arrangements (la)							
alone	-1.09	-0.35	-0.38	0.74**	-0.03	↑	no significant change
co-residence®							
household PCME	-0.24	-0.39	-0.16	-0.16**	0.23**	↓	↑
age	-0.10	-0.08	-0.10	0.01**	-0.02**	↑	↓
gender							
male	2.01	1.84	2.23	-0.17**	0.39**	↓	↑
female®							
marital status							
widowed and others[1]	-0.30	0.52	0.30	0.81**	-0.21*	↑	↓
married®							
education							
Illiterate	0.75	1.19	0.81	0.44**	-0.38**	↑	↓
literate but below matriculation	0.80	0.98	0.79	0.18*	-0.20*	↑	↓
matriculation and above®							
assets							
not owing	-0.38	-0.23	×	0.15**	×	↑	×

owing: not managing	-0.63	-0.15	×	0.48 **	×	↑	×
owing: managing®							
property							
not owing	-0.78	-1.44	×	-0.66 **	×	↓	×
owing: not managing	-1.44	-1.92	×	-0.47 **	×	↓	×
owing: managing®							
immobility							
severe	-1.40	-0.34	-1.75	1.06 **	-1.41 **	↑	↓
partial	-0.88	-1.37	-2.04	-0.49 **	-0.67 **	↓	↓
no difficulty in mobility®							
no. of chronic diseases	-0.26	-0.07	-0.25	0.19 **	-0.18 **	↑	↓
no. of impairments	×	-0.16	-0.25	×	-0.08 *	×	↓
self-perceived health							
poor	×	-1.24	-0.47	×	0.77 **	×	↑
good/fair	×	-0.43	-1.13	×	-0.71 **	×	↓
excellent/very good®							
intercept	5.48	6.40	5.56				

note 1:* indicates that the change in effect is significant at 5% level of significance

note 2: indicates that the change in effect is significant at 1% level of significance**

note 3: upward arrows (↑) show a significant increase in the likelihood of remaining economically active in one reference period over the previous

note 4: downward arrows (↓) show a significant reduction in the likelihood of remaining economically active in one reference period over the previous

note 5:(×) denotes that figures are not available for comparison/ data not available

Table 3: The estimates of parameters of the curve of proportion economically active as a function of time after 60 years

functional form of the curve fitted: $y = \beta_0.(\beta_1)^t$						
reference period	**1986-87**		**1995-96**		**2004**	
parameters	β_0	β_1	β_0	β_1	β_0	β_1
rural male	0.84	0.94	0.91	0.95	0.84	0.95
rural female	0.19	0.91	0.36	0.88	0.36	0.87
urban male	0.61	0.93	0.68	0.91	0.46	0.94
urban female	0.10	0.90	0.13	0.90	0.19	0.85

note 1: all the parameters are found to be significantly differing from 0

note 2: The reference point for t is 60 years i.e. t = 0 at age 60 years

Figure 1: The proportion of economically active rural male oder adults over ages for the reference periods 1985-86, 1995-96 and 2003-04

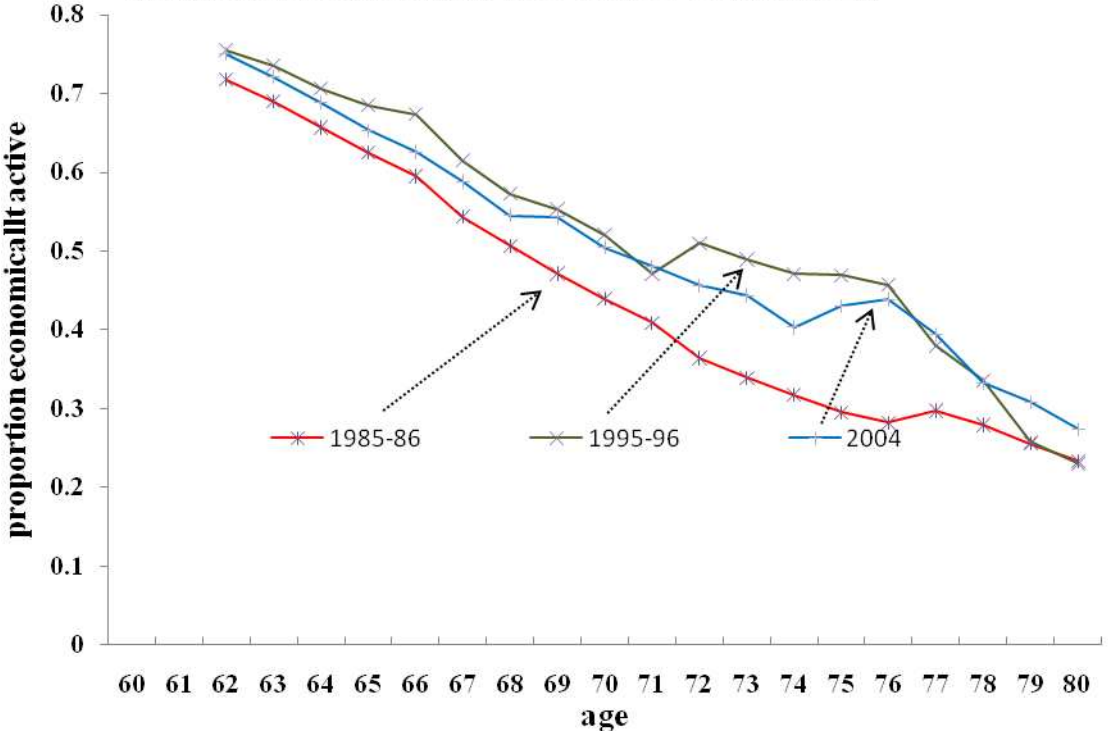

Figure 2: The proportion of economically active urban male oder adults over ages for the reference periods 1985-86, 1995-96 and 2003-04

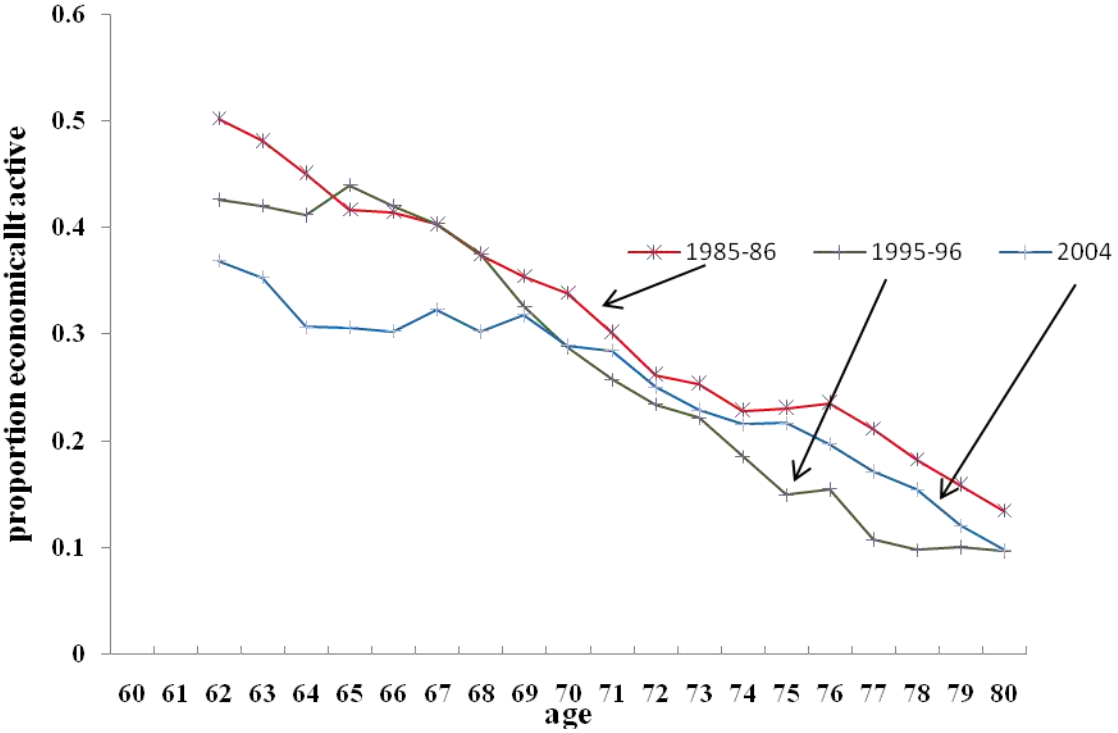

Figure 3: The proportion of economically active rural female oder adults over ages for the reference periods 1985-86, 1995-96 and 2003-04

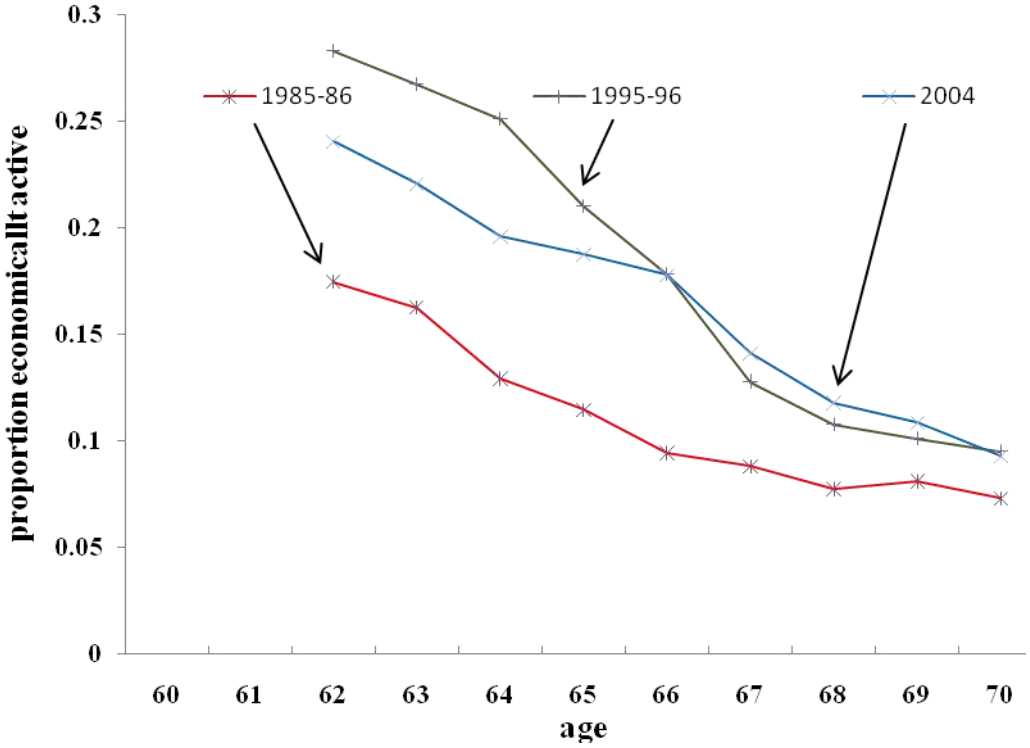

Figure 4: The proportion of economically active urban female oder adults over ages for the reference periods 1985-86, 1995-96 and 2003-04