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Active Ageing and Labour Market Outcomes—An Analysis Using Survey Data in Urban India

Panchanan Das
University of Calcutta, Kolkata, India

This paper undertakes an analysis of labour market outcomes among aging population in Indian labour market by using household and personal level characteristics obtained from periodic labour force survey (PLFS) data for 2023-2024. It provides an analysis of the association of demographic and household characteristics with probability of choosing either paid-employment or self-employment by applying discrete choice model, after controlling for sample selection bias. By following strategic choice framework, endogenous sample selected probit model is used in finding out the role of different covariates in determining the chance of continuing work in self-employment and wage employment of any type after the age of statutory retirement. Social, economic, and other factors like gender are considered as key factors towards labour market participation of the aging population. This study examines the effects of age and education on decision to choose type of employment by the people beyond their statutory retirement age. The coefficient of female dummy is positive in regular-paid jobs and unpaid household work, but negative for own accounts work and employer irrespective of age cohorts suggesting that women are more likely to continue as regular paid jobs and unpaid household work, but less likely to be employer and own account worker as compared to men even after age 60 years and above.

Keywords: ageing population, labour force participation, developing Asia

Introduction

The consequences of demographic transition towards aging population on economic activities have been well discussed in theoretical and empirical studies, but the analysis is restricted mainly to more developed OECD (Organisation for Economic Co-operation and Development) countries where the ageing process has already been advanced. In these countries, economic growth declined because of the rising proportion of people over the age of 65 through the declining rate of saving in this region. In Asia, Japan and China and the newly industrialised economies like Hong Kong, Korea and Singapore also experienced roughly similar type of problem of demographic transition towards an aging population. Recently, some developing countries in the region have been starting to follow the similar demographic path.

The rising proportion of the over-65s in total population is a recent phenomenon in the developing part of Asia and this demographic change motivates to carry out an empirical enquiry into the effects of population ageing on the labour market outcomes. The impacts of ageing on health care expenditure and government

Panchanan Das, Ph.D., professor of economics, Department of Economics, University of Calcutta, Kolkata, India.
Correspondence concerning this article should be addressed to Panchanan Das, B 14/14, Samadrita CHS, ECTP Phase III, Rajdanga Main Road, Kolkata 700107, India.

expenditure on pension are clearly understood. But, the ageing effects on labour market outcomes are not straight forward. In most cases, ageing workers are forced to quit from the labour market as they reach the mandatory retirement age. In India, workable ageing people are forced out of their formal employment after the statutory retirement age. In a well-developed labour market, the demand for ageing workers depends on the state of the labour market and the business cycle along with the legislative and social factors. But, the labour market in India, as in other developing countries, is not well-developed and the major part of employment is informal which makes the ageing problem in labour market more complicated.

The focus of this study is on labour market outcomes for ageing population in India, the country where the demographic transition towards ageing is at the very initial stage. The ageing problem in India is distinct from that in the developed world and more complex because population ageing appears much before the country has grown wealthy. Population ageing in India may not result in declining labour supply because of its notable share of young age people. This phenomenon is contrasting to the experience of the developed countries. The share of young age people is still dominating in the workforce and the economy is passing through the phase of demographic dividend. In India, the share of population with age 60 and above was nearly 9 per cent in 2016 (GOI, 2017). There is no dearth of literature dealing with the consequences of population ageing in labour market, but mostly of them have focused on developed countries in macroeconomic framework by using UN DESA database. However, the studies on labour market outcomes for ageing people by using micro level data are very much limited for developing economies (in India, for example, Chattopadhyay et al., 2022).

This study analyses active ageing in the shape of continuing participation in labour market beyond the statutory retirement age in India. Active ageing, the process of optimising opportunities for participation in labour activities and labour market dynamics, assumes significance in analysing wellbeing of older people. As the official retirement age in many public sector organisations remains around 60-65, people beyond the retirement age can engage in informal employment and employment opportunities decline as age advances. The major labour market issues relating to ageing covered in this study are the nature of elderly labour force, working conditions, and pay associated with it.

Ageing people are not homogenous across age cohorts. The issues and concerns of the elderly in different age groups are different. This study focuses on active ageing and labour market outcomes in India by taking two age cohorts within the ageing people—people with age between 60 and 65 years, and people with age above 65 years. Population ageing has not been experienced uniformly across all the states of India.

The rest part of the study is organised as follows. Section 2 describes in short the pattern of demographic transition in Asia and India. Section 3 is a short description on data and major covariates used in empirical analysis. Section 4 is the methodology describing extended probit model where self-selection is assumed to be endogenous. Section 5 displays summary statistics on labour market participation among the aging people. Section 6 interprets empirical findings. Section 7 summarises and concludes.

Demographic Transition

In Asia, the share of population over 65 remained stable at around 4 per cent and the median age declined from 22 to 20 years during 1950 and 1975 implying that the Asian economy was dominated by the young age people. The old-age dependency ratio was at below seven in 1975. During the 1980s and 1990s the developing part of Asia as in other developing regions experienced rising proportion of the youth that led to reduce the dependency ratio which assumes significance in enhancing the saving rate and the growth of per capita GDP.

Economic growth in East and South-East Asia moved up partly because of their demographic dividend during this period (Bloom & Canning, 2006). The experience of East Asia reveals that the rise in domestic savings because of the growth of working age people was absorbed mostly in productive investment during the 1990s (Canning, 2007). Asia's demographic landscape changed dramatically by 2005 showing a sharp rise in the share of elderly population, the median age, and the old-age dependency ratio (UN, 2006).

More than 50 per cent of global ageing population is living in Asia and majority of them are women. About one-fourth of economically active ageing population is women. But, a marked difference is observed in the speed of this transition across the regions in the continent. While the Eastern part experienced a rapid growth of ageing population, the Western Asia grew very slowly. Japan displays the highest incidence of ageing population and old-age dependency. The other developed parts of Asia remain below the ageing line of Japan. While most of the developing parts of the continent have been dominated by the working age people and some of them have the potential for demographic dividend, population aging has been proceeding at a much faster rate because of rising life expectancy.

An unprecedented wave of demographic changes in the form of rising median age and life expectancy has been undergoing in India as well leading to a dramatic increase in the population of elderly age 60 years and above. In India, the median age declined from 20 years in 1950 to 18 years in 1970, but exhibited rising trend thereafter showing elongated U shaped curve (Figure 1). The median age jumped at 28 years in 2023. Women's life expectancy at age 65 has long exceeded that of men globally and, in India, the gap has been widening. Life expectancy at age 65 years for males and females increased respectively from 10.7 and 11.1 in 1950 to 14.8 and 16.1 in 2023 after a severe break in 2021 because of COVID 19 pandemic. People aged 60 and above accounted for 8.5 per cent in Census 2011, a significant jump from 6.4 per cent in 1981 census and from 5.5 per cent in 1951 census. People ageing 75 years and above increased from less than 1 per cent in 1951 to nearly 2 per cent in 2011. The proportion of the oldest old with age at least 80 years has more than doubled over the past seven decades. These observed facts indicate that population ageing may be a serious cause of concern in India.

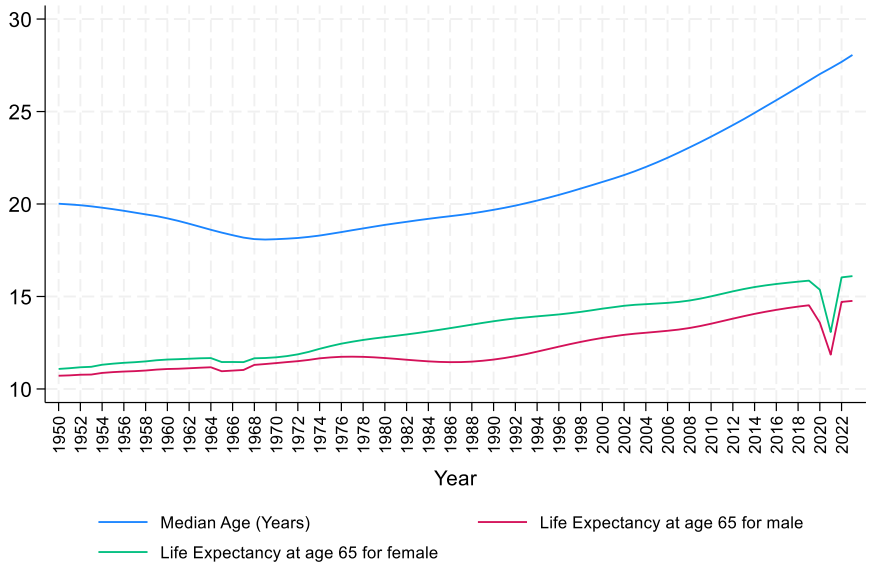

Figure 1. Demographic transition in India.
Source: *World Population Prospects 2024*, Department of Economic and Social Affairs, United Nations.

Data and Variables

The periodic labour force survey (PLFS) for 2023-2024 is used in this study. It provides quarterly estimates of key labour market indicators on the basis of the current weekly status (CWS) approach capturing both supply of and demand for labour. To construct the dependent variable, job quality for wage workers, we have used usual principal activity status, type of job contacts, National Code of Occupation (NCO), and availability of at least one social security benefit. Number of years in formal education, age, household's expenditure on durable goods, along with the categorical variables like sector, sex, social status, and religion are used to construct regressors. Working activities with usual principal status code 31, type of job contact code 4, one digit NCO 1 to 4, and enjoying at least one social security benefit are identified as good quality jobs in wage employment. For bad quality jobs, usual principal status codes are 41 and 51, type of job contact code is less than four, one digit NCO 5 to 9, and enjoying no social security benefit.

Individual's decision to continue in employment depends on demographic, social, and economic factors like age, gender, social groups, household's income, household's activity status, and education. In addition, government policy, external shocks to the economy, and size of the informal economy also affect the incidence of employment among the aging population. There is a gender gap in employment even at the old age, which can be attributed to cultural factors, number of children in the household, and extent of educational attainment. In India, women have a higher rate of entrance into self-employment may be because of staying at home with children. Women with an increase in education are less likely to enter self-employment. Older people are more likely to be self-employed, which is due to an increase in knowledge and work experience, larger networks, an increase in educational attainment, a longer credit history, and greater resources. People who have a higher income, or access to funding, are more likely to enter self-employment.

To find out the crucial role of gender in taking decision towards employment of any type after the statutory retirement age, this study includes female dummy as a key covariate along with age. The non-linear effect of age is captured by taking its square term as additional covariate. As some occupations are highly religion and caste specific, social status as a proxy for castes is included as possible explanatory variables to find out their role in occupational choice. Labour force participation and choice of work by the aging people are potentially influenced by household structure. In this study, the household structure is proxied by dependency ratio, the ratio of the number of dependent children under the age of 15 to total number of household members.

Self-employment is basically a group of highly heterogenous activities and it is important to control for the role of education in choosing self-employment type. We may hypothesise that the people with higher level of education are motivated to choose self-employment as high skilled professional, while less educated people are motivated to choose self-employment as low skilled activities. Arguments are made in the literature for both a positive and a negative association between education level and probability of entering into self-employment. Skills needed for entrepreneurship, for example, may not necessarily be associated with formal education, but skills for being lawyer or any other professional are related with formal education.

Methodology

We assume that decision to continue job by the ageing people in the labour market is a problem of strategic choice. Nested model used in this study to capture the strategic nature of job selection by taking into account the

potential selection bias is based on Signorino (2003). The strategic choice problem can be summarised in two stages, each containing two possible outcomes on the basis of information sets.

The sample set consists of the ageing people who were in job either in self-employment or in wage employment till their statutory retirement age. There is no statutory retirement age in self-employment, but it still remains in wage-employment in most cases at age of 60 years and in some cases at 65 years. In this study, both 60 years and 65 years are considered as the threshold age for aging people. A person can continue work either as own account worker, or employer or unpaid worker if the person was in self-employment of any type at the threshold age. But, if a person was in wage employment, the person can continue as regular salaried worker or casual worker, or can shift to self-employment of any type after reaching at statutory retirement age. The first stage problem is the selection problem of remaining in employment after the threshold age. A person in the labour market who was employed till the threshold age has to decide whether he or she should continue in a job or not. If a person wants to continue in job, then the problem of job selection appears which may be treated as a problem of strategic choice. The second stage is the outcome problem of choosing employment type. So, labour market ultimately shows three different options for aging people: quit the labour market, self-employed, and paid-employed, and each is associated with a specific utility. We assume that individuals have full information in each stage.

Simple binary outcome models like logit and probit are not applicable to find out the empirical results in such cases. The underlying assumption of simple binary response model is statistical independence between the outcomes, while, conceptually, the outcomes in each stage are strategically dependent. Thus, the problem of self-selection bias appears in estimating the probability of being self-employed or paid-employed of a particular type in a labour market because employed workers are not selected randomly in the sample. In this study the self-selection bias is corrected by applying conditional probit model where selection bias is considered as endogenous. This methodology is very much similar to Heckman's method for correcting selection bias.

We specify the selection (continue in employment) and outcome (being self-employed or paid-employed) equations in the following manner:

$$y_{1i}^{*} = \beta' x_{1i} + u_{1i} \tag{1}$$

$$y_{2i}^{*} = \gamma' x_{2i} + u_{2i} \tag{2}$$

The dependent variables in Equations (1) and (2) are latent variable representing the difference in utility between being continuing employment and quieting labour market, and between being self-employed and wage-employed respectively. Equations (1) and (2) are similar to the random utility model developed by Manski (1977).

The observed dichotomous variables for Equations (1) and (2) are constructed on the basis of the following rule:

$$y_{ji} = \begin{matrix} 1, for & y_{ji}^{*} \geq 0 \\ 0, for & y_{ji}^{*} < 0 \end{matrix} \tag{3}$$

In the selection equation the treatment variable, y_{1i} , is dichotomous taking its value 1 for a person who is continuing job after retirement age. The non-selected group is opted out from the labour market and represented by $y_{1i} = 0$. In the outcome equation, the response variable, y_{2i}, is also binary with its value 1 for self-employed and 0 for wage employed. The response variable y_{2i} appears only when the treatment variable takes its value 1.

Therefore, job choice process of the aging people contains the following three mutually exclusive cases:

$$z_{0i} = \begin{matrix} 1, if & y_{1i} = 0 \\ 0, & otherwise \end{matrix} \tag{4}$$

$$z_{1i} = \begin{matrix} 1, if & y_{1i} = 1 \; and \; y_{2i} = 0 \\ 0, & otherwise \end{matrix} \tag{5}$$

$$z_{2i} = \begin{matrix} 1, if & y_{1i} = 1 \; and \; y_{2i} = 1 \\ 0, & otherwise \end{matrix} \tag{6}$$

The binary variable z_{0i} takes a value of one for optout from employment; z_{1i} represents wage employment; and z_{2i} is the dummy variable for self-employment.

Therefore,

$$P_{0i} = P(z_{0i} = 1) = F(-\beta' x_{1i}) \tag{7}$$

$$P_{1i} = P(z_{1i} = 1 | z_{0i} = 0) = \begin{cases} F(-\gamma' x_{2i}) - F(-\beta' x_{1i}), if & \beta' x_{1i} = \gamma' x_{2i} \\ 0 & otherwise \end{cases} \tag{8}$$

$$P_{2i} = P(z_{2i} = 1 | z_{0i} = 0) = \begin{cases} F(\gamma' x_{2i}), if & \beta' x_{1i} > \gamma' x_{2i} \\ F(\beta' x_{1i}), if & \beta' x_{1i} \leq \gamma' x_{2i} \end{cases} \tag{9}$$

The log likelihood function,

$$ln(L) = \sum_{j=0}^{2} \sum_{i=1}^{n} z_{ji} P_{ji} \tag{10}$$

A person will choose self-employment when

$$U(z_{2i}) - U(z_{1i}) = U(y_{1i} = 1 \; and \; y_{2i} = 1) - U(y_{1i} = 1 \; and \; y_{2i} = 0) > 0 \tag{11}$$

The endogeneity problem appears in job selection model because

$$cov(u_{1i}, u_{2i}) \neq 0 \tag{12}$$

To correct self-selection bias, the popular method suggested in the literature is two-step Heckman (1979) method. But, this method has some inherent problem in addition to the requirement of covariate exclusion restriction. In this study, we have used extended probit model with endogenous sample selection. We assume that unobserved errors $u_{1i} \; and \; u_{2i}$ follow normal distribution with 0 mean and covariance Σ, where

$$\Sigma = \begin{bmatrix} \sigma_{11} & \sigma_{12} \\ \sigma_{21} & \sigma_{22} \end{bmatrix} \tag{13}$$

The probit regression of the response variable for self-employment is

$$y_{2i} = \begin{matrix} 1, for & \gamma' x_{2i} + u_{2i} \geq 0 \\ 0, for & \gamma' x_{2i} + u_{2i} < 0 \end{matrix} \tag{14}$$

The log likelihood is

$$ln(L) = \sum_{i=1}^{n} w_i \left(y_{2i} lnF(\gamma' x_{2i}) + (1 - y_{2i}) lnF(-\gamma' x_{2i}) \right) \tag{15}$$

Here, w_i is the weight and F is the distribution function.

The conditional probability of choosing self-employment is

$$P(y_{2i} = 1 | x_{2i}) = E(y_{2i} | x_{2i}) = F(\gamma' x_{2i}) \tag{16}$$

The conditional probability defined by the standard normal distribution function is one-sided. The lower and upper limits of the unobserved error u_{2i} based on the observed values of y_{2i} and x_{2i} are defined as

$$l_{1i} = \begin{cases} -\infty & y_{2i} = 0 \\ -\gamma' x_{2i} & y_{2i} = 1 \end{cases} \tag{17}$$

$$l_{2i} = \begin{cases} -\gamma' x_{2i} & y_{2i} = 0 \\ \infty & y_{2i} = 1 \end{cases} \quad (18)$$

The log likelihood is redefined as

$$ln(L) = \sum_{i=1}^{n} w_i \, lnF_2^*(l_{1i}, l_{2i}, 1) \quad (19)$$

The conditional probability of choosing self-employment is redefined as

$$P(y_{2i} = 1|x_{2i}) = F_2^*(-\gamma' x_{2i}, \infty, 1) \quad (20)$$

The lower and upper limits of the error in selection equation u_{1i} based on sample values of y_{1i} are given as

$$l_{1si} = \begin{cases} -\infty & y_{1i} = 0 \\ -\beta' x_{1i} & y_{1i} = 1 \end{cases} \quad (21)$$

$$l_{2si} = \begin{cases} -\beta' x_{1i} & y_{1i} = 0 \\ \infty & y_{1i} = 1 \end{cases} \quad (22)$$

The log likelihood of the endogenous sample selected probit model is

$$ln(L) = \sum_{\substack{i=1 \\ i \in S}}^{n} w_i \, lnF_1^*\big((l_{1i}, l_{1si}), (l_{2i}, l_{2si}), \Sigma\big) + \sum_{\substack{i=1 \\ i \notin S}}^{n} w_i \, lnF_2^*\big((l_{1si}, l_{2si}), 1\big) \quad (23)$$

Here, S is the set of observation where y_{2i} is observed.

The conditional probability of a person to be employed is

$$P(y_{1i} = 1|x_{1i}) = E(y_{2i}|x_{2i}) = F_1^*(-\beta' x_{1i}, \infty, 1) \quad (24)$$

Labour Market Participation by Age and Gender

The types of labour market participation among aging males and females by two age cohorts in urban India are shown in Table 1. Labour force participation rate is much higher among aging men than aging women and the rate is less in the higher age cohort irrespective of gender in urban India. Around 45 per cent of male in the age group 60 to 64 years were not in the labour force and this share was nearly three-fourth among the aging male with age 65 years and above. The respective shares were more than 85 per cent and more than 90 per cent respectively among urban women. Just above one-third of urban male in the age group 60-65 years were engaged as own account worker or employer and this share declined in the upper age cohort. The share of aged women in own account work with or without employee was much less than men, but the women participation in unpaid family work was more in the age group 60-65 years. As per PLFS 2023-2024, around 12 per cent of urban male in age group 60-64 years were engaged in regular paid job, while women participation in this type of jobs was below 5 per cent in this age cohort.

Table 1

Distribution of Aging Male and Female by Activity Type

Age group (years)	Urban male		Urban female	
	60-65	Above 65	60-65	Above 65
Own account worker or employer	33.8	18.3	5.5	3.5
Unpaid family worker	1.2	1.5	2.6	1.5
Regular paid worker	12.2	4.1	4.7	1.7
Casual wage worker	7.1	1.8	1.9	0.9
Unemployed	0.3	0.1	0.1	0
Not in labour force	45.4	74.1	85.3	92.5

Source: Table 15, PLFS Report 2023-2024.

Major part of the aging population who are still active in the labour market are own account workers or employer under self-employment. Tables 2 and 3 display the distribution of different types of jobs by skill level of the aging people both for male and female within the age group of 60 to 65 years and beyond 65 years respectively who were still working in different activities. Around three fourth of own account workers irrespective of gender in the age group 60-65 years were in job skill level 2 consisting of clerks, service workers in shops, skilled agricultural workers, workers relating to trade, and plant and machine operators that require 11-13 years of formal education. The share of own account workers among the older aging was higher showing more gender gap than the old aging people. In own account work for workers in 60-65 years age, women's share was much higher than men in elementary or unskilled occupations, while women's share was much less in high skilled professional. No such gender gap appeared among the ageing people beyond 65 years. On the other hand, among employers in self-employment who may be treated as entrepreneur, men's share was much more than women's share in low skilled occupation and women's share was more than men in high skilled occupations in both age cohorts, but the gender gap was more in 60-65 age group. In unpaid work, both male and female workers of both age cohorts were concentrated in low skilled occupations, and women's share was much more than men's share in the younger aging group. In regular paid jobs, women were mostly concentrated in elementary or unskilled occupations and men workers were mainly concentrated in low skilled jobs in both age groups. Most of the casual workers irrespective of gender were engaged in elementary jobs, but women's share was more than men's share.

Table 2

Distribution of Job Type by Skill Level (Age Between 60 to 65 Years): 2023-2024

Job type	Gender	Job skill level*				
		1	2	3	4	5
Own account worker	Male	5.9	74.2	3.4	7.4	9.1
	Female	17.0	75.7		1.6	5.7
Employer	Male	1.0	38.4	3.4	5.1	52.1
	Female		8.4		28.4	63.2
Unpaid worker	Male	4.4	65.3	15.8		14.5
	Female	14.3	82.0			3.7
Regular paid	Male	10.5	68.8	5.9	9.3	5.4
	Female	68.2	20.5	2.1	8.3	0.9
Casual work	Male	74.6	24.6	0.8		
	Female	81.7	18.3			

Note. * job skills are summarised in appendix. Source: Author's estimation from PLFS (2023-2024) unit level data.

Table 3

Distribution of Job Type by Skill Level (Age Above 65 Years)

Occupation type	Gender	Job skill level*				
		1	2	3	4	5
Own account worker	Male	4.5	76.1	2.8	7.0	9.6
	Female	3.1	80.7	0.0	6.9	9.3
Employer	Male		42.4	2.8	7.2	47.6
	Female		33.6		12.3	54.2

Table 3 to be continued

Unpaid worker	Male	2.2	83.8	2.8	3.7	7.6
	Female		85.7		3.8	10.5
Regular paid	Male	11.2	65.7	4.9	14.8	3.4
	Female	58.8	31.6	0.0	8.9	0.7
Casual work	Male	60.1	38.6	1.3		
	Female	82.2	17.8			

Note. * job skills are summarised in appendix. Source: As for Table 2.

Empirical Findings

By following strategic choice framework, endogenous sample selected probit model is used in finding out the role of different covariates in determining the chance of continuing work in self-employment and wage employment of any type after the age of statutory retirement. Tables 4 and 5 display the estimated coefficients for aging people with age group 60 to 65 years and beyond 65 years respectively. The lower part of the Tables shows the estimated coefficients of endogenous selection model corresponding to different outcomes of being wage-employment and self-employment in these two age cohorts. The selection model captures the likelihood of aging person to be employed by taking quit from labour market as the non-selected group. The outcome equation in the upper part displays the conditional probit estimates of likelihood of being regular-paid worker in wage employment group and own account worker, employer and unpaid worker in self-employment group. As only two forms of wage employment (regular paid and casual) are available in the sample data, we have estimated the model for regular-paid workers only, because the coefficients of the covariates for casual wage workers will be the same with opposite sign. The model is estimated separately for active aging people within the age group 60-65 years and above 65 years by taking female dummy along with other covariates to find out the mean differential effects of being employed between men and women in each employment category. The objective of including a selection model is to capture the inherent problem of selection bias. The row at the end of the Tables confirms whether the conditional probit model fits well in explaining the likelihood of different forms of employment under the condition that a person being employed.

Non zero correlation between errors in outcome equation and errors in selection equation implies that sample selection is endogenous. Estimated correlation is positive for employer and own account worker in self-employment, but negative for regular paid workers within wage-employment group and unpaid workers in self-employment group. The positive correlation for employer and own account worker implies that unobserved factors that increase the chance of being employed would increase the impact of unobserved factors that increase the chance of continuing these activities. This impact is significantly higher among the people of age above 65 years of being employer. In other words, the likelihood of being employer is more among the aging people in upper age cohort than in lower age cohort. As the correlation is negative for regular paid worker in both of the age cohorts, the unobserved factors that increase the chance of being employed tend to occur with unobserved factors that decrease the chance of being regular paid worker.

The estimated coefficients of the selection model are roughly similar for each category of self-employment, but they are different from those in wage employment in each age cohort of aging people. In age group 60-65 years, older persons, other things equal, are more likely to be employed in self-employment group of any type, but at a diminishing rate. This finding is well established in the literature irrespective of gender. In wage

employment, however, the age effect is negative among aging people within this age group. Among the older aging people, on the other hand, the age effect is statistically insignificant in all cases. Persons with higher education level are less likely to continue either in wage-employment or self-employment in the age beyond 60 years. Highly educated people were expected to be in better paid jobs and they are less interested to continue work after statutory retirement age. Technical education has no significant role in selecting a person as self-employed, while it is significantly related to the probability in wage-employment within the age group 60-65 years. But, in upper age cohort the findings are opposite. Female participation in employment is less than men's participation and it is much less in any type of self-employment irrespective of age cohorts among the aging people. However, the respective coefficients are much less in age group 60-65 years.

The upper part of Tables 4 and 5 depicts the estimated coefficients of outcome equations for regular salaried people in wage employment and different forms of self-employed (own account worker, employer and unpaid worker) for the age groups 60-65 years and above 65 years respectively. The coefficient of female dummy is positive in regular-paid jobs and unpaid household work, but negative for own accounts work and employer irrespective of age cohorts suggesting that women are more likely to continue as regular paid jobs and unpaid household work, but less likely to be employer and own account worker as compared to men even after age 60 years and above. The age effect is significantly positive with diminishing effect only in regular paid jobs and this effect is stronger in upper age cohort of the aging people.

Contrasting to the selection equation, the likelihood of regular paid employment and self-employment is more among the employed persons with higher level of education in the outcome equation and it is roughly similar in both age cohorts. But, technical education has no significant role in determining job choices by people after age 60 years. Dependency ratio has no significant effect on likelihood of job choice beyond age 60. However, larger number of dependent family members increase the probability of unpaid work among the aging people. Household status defined in terms of major working activity has significant effect on probability to join a particular type of work activity. People from self-employed households are less likely to join as regular paid jobs as compared to people from other household types characterized as regular salaried and casual worker.

A significant variation is observed in likelihood of self-employment by social groups. People from non-Scheduled Tribes households are less likely to continue work as regular paid worker after 60 years of age compared to Scheduled Tribes and the difference is more among the people with age above 65 years. However, self-employed as employer is more likely among people in non-Scheduled Tribes households and the mean difference is the most between them and upper castes people.

Table 4

Probit Estimation for Wage and Self-Employment (Age Group 60-65 Years)

Outcome model	Regular salaried work	Employer	Own account work	Unpaid work
Age	0.29***	-0.09	0.02	-0.002
Age^2	-0.002**	0.0004	-0.0006**	0.0004
Year of schooling	0.07***	0.04***	-0.03***	0.02***
Technical education	0.38	0.07	0.05	-0.11*
Female	0.84***	-0.96***	-1.07***	1.13***
Dependency ratio	-0.04	-0.01	-0.07*	0.14***
Self-employed household	-0.12**	0.27***	-0.08***	0.03***
Scheduled caste	-0.53***	0.33**	-0.17***	0.11**

Table 4 to be continued

Other backward caste	-0.28***	0.45***	-0.06	0.00
Upper caste	0.06	0.50***	-0.08	0.00
Intercept	-10.18***	0.94	0.44	-1.22
Selection model: wage employed		Selection model: self-employed		
Age	-0.20***	0.01	0.01	0.01
Age^2	0.001***	-0.0005*	-0.0005*	-0.0005*
Year of schooling	-0.03***	-0.02***	-0.02***	-0.02***
Technical education	0.24***	0.09	0.10	0.09
Scheduled caste	0.44***	-0.11**	-0.11**	-0.10***
Other backward caste	0.22***	0.02	0.02	0.02
Upper caste	0.10	0.01	0.01	0.01
Female	-0.71***	-1.02***	-1.02***	-1.02***
Intercept	7.84***	0.89	0.80	0.81
Corr. (selection error, outcome error)	-0.99***	0.85***	0.99***	-0.99***

Source: As for Table 2.

Table 5

Probit Estimation for Wage and Self-Employment (Age Group Above 65 Years)

Outcome model	Regular salaried work	Employer	Own account work	Unpaid work
Age	0.49***	-0.03	0.04	-0.01
Age^2	-0.003***	0.000005	-0.001	0.0004
Year of schooling	0.06***	0.03***	-0.02***	0.01**
Technical education	3.18	0.08	0.12	-0.19**
Female	0.80***	-0.92***	-0.94***	0.99***
Dependency ratio	0.002	0.05	-0.06	0.09**
Self-employed household	0.01	0.12	-0.07***	0.05***
Scheduled caste	-0.80***	0.24	-0.12	0.07
Other backward caste	-0.57***	0.34*	-0.0002	-0.05
Upper caste	-0.20	0.34*	-0.001	-0.05
Intercept	-17.65***	-0.74	-0.14	-0.96
Selection model: wage employment		Selection model: self-employment		
Age	-0.16	0.004	-0.001	0.002
Age^2	0.001	-0.0004	-0.0004	-0.0004
Year of schooling	-0.03***	-0.01***	-0.02***	-0.01***
Technical education	0.14	0.15**	0.16**	0.15*
Scheduled caste	0.59***	-0.04	-0.04	-0.04
Other backward caste	0.43***	0.09	0.08	0.09
Upper caste	0.26**	0.09	0.07	0.08
Female	-0.63***	-0.92***	-0.92***	-0.92***
Intercept	6.36*	0.99	1.20	1.05
Corr. (selection error, outcome error)	-0.99***	0.99***	0.99***	-0.99***

Source: As for Table 2.

Conclusions

Asia's demographic landscape changed dramatically by 2005 showing a sharp rise in the share of elderly population, the median age, and the old-age dependency ratio (UN, 2006). More than 50 per cent of global ageing

population is living in Asia and majority of them are women. An unprecedented wave of demographic changes in the form of rising median age and life expectancy has been undergoing in India as well leading to a dramatic increase in the population of elderly age 60 years and above.

Active ageing, the process of optimising opportunities for participation in labour activities and labour market dynamics, assumes significance in analysing wellbeing of older people. This study analyses labour market outcomes for ageing population in India. The ageing problem in India is distinct from that in the developed world and more complex because population ageing appears much before the country has grown wealthy. The study considers two age cohorts within the ageing people—people with age between 60 and 65 years, and people with age above 65 years because the issues and concerns of the elderly in different age groups are different.

Labour force participation rate is much higher among aging men than aging women and the rate is less in the higher age cohort irrespective of gender in urban India. The share of aged women in own account work with or without employee was much less than men, but the women participation in unpaid family work was more in the age group 60-65 years. Major part of the aging population who are still active in the labour market are own account workers or employer under self-employment.

By following strategic choice framework, endogenous sample selected probit model is used in finding out the role of different covariates in determining the chance of continuing work in self-employment and wage employment of any type after the age of statutory retirement. The selection model captures the likelihood of aging person to be either wage-employed or self-employed by taking quit from labour market as the non-selected group. The outcome model shows the conditional probit estimates of likelihood of being regular-paid worker in wage employment group and own account worker, employer and unpaid worker in self-employment group. The model is estimated separately for active aging people within the age group 60-65 years and above 65 years by taking female dummy along with other covariates to find out the mean differential effects of being employed between men and women in each employment category.

In the selection model in age group 60-65 years, older persons, other things equal, are more likely to be employed in self-employment group of any type, but at a diminishing rate. In wage employment, however, the age effect is negative among aging people within this age group. Highly educated people were expected to be in better paid jobs and they are less interested to continue work after statutory retirement age. Female participation in employment is less than men's participation and it is much less in any type of self-employment irrespective of age cohorts among the aging people. In outcome equation, on the other hand, the coefficient of female dummy is positive in regular-paid jobs and unpaid household work, but negative for own accounts work and employer irrespective of age cohorts suggesting that women are more likely to continue as regular paid jobs and unpaid household work, but less likely to be employer and own account worker as compared to men even after age 60 years and above. A significant variation is observed in likelihood of self-employment by social groups. People from non-Scheduled Tribes households are less likely to continue work as regular paid worker after 60 years of age compared to Scheduled Tribes and the difference is more among the people with age above 65 years.

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Appendix

Table 1

Job Skill Level

Job skill level	Occupation type	NCO (1 digit)	Educational requirement
1	Elementary occupations	9	Up to 10 years of formal education and/or informal skills
2	Clerks, service workers and shop & market sales workers, skilled agricultural and fishery workers, craft and related trades workers, plant and machine operators and assemblers	4-8	11-13 years of formal education
3	Associate professionals	3	14-15 years of formal education
4	Professionals	2	More than 15 years of formal education
5	Legislators, senior officials, and managers	1	Not defined