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Poverty Transitions, Health, and Socio-Economic Disparities in India

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Keywords

SDGs, poverty transitions, NCDs, disabilities, socio-economic disparity, schooling, health care priorities

Disciplines

Disability Studies | Diseases | Inequality and Stratification | Social and Behavioral Sciences | Sociology

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Poverty Transitions, Health, and Socio-Economic Disparities in India^a

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SDGs offer an inclusive and just vision for 2030, in which the interrelationships between (near) elimination of poverty, health reforms and elimination of socio-economic disparities play an important role. The present study focuses on the associations between poverty transitions over a period, and health indicators such as NCDs, disabilities, socio-economic disparities, state affluence and inequality in income distribution. These health indicators reflect their growing importance in recent years. We have used a Multinomial Probit specification which is an improvement on the methodologies used in earlier research. The analysis is based on panel data from the *India Human Development Survey 2015*. What our analysis emphasises is that changes in the prevalence of poverty/headcount ratio over time do not throw light on how poverty has evolved: whether there were escapes from poverty, whether there were descents into poverty, whether segments persisted in poverty, and whether (the relatively) affluent remained largely unaffected. A significant contribution of this study is to explore the relationships between such poverty transitions and NCDs and disabilities, socio-economic disparities and other covariates. The analysis confirms these linkages. Drawing upon this analysis and other relevant research, policy challenges in achieving the SDG vision of an inclusive and fair economy are delineated.

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Introduction

Five Sustainable Development Goals (SDGs) set targets that relate to the reduction of health inequalities nationally and worldwide. These targets are poverty reduction, health and wellbeing for all, equitable education, gender equality, and reduction of inequalities within and between countries. The interaction between inequalities and health is complex: better economic and educational outcomes for households enhance health, low socioeconomic status leads to chronic ill health, and non-communicable diseases (NCDs) reduce income status of households¹.

Among the several health indicators, we have chosen two: non-communicable diseases/NCDs and disability, as their burden has risen in recent years and the costs of overcoming them will be enormous.

NCDs are typically present in individuals aged 55 years or older in many developed countries, but their onset occurs in India a decade earlier (≥ 45 years of age). In 2018, as contributions to the Global Burden of Diseases, Risk Factors, and Injuries (GBD) Study, the India State-Level Disease Burden Initiative Collaborators produced an analysis of state variations in epidemiological transition levels (ETL) during 1990–2016. Four recent papers, published in *The Lancet Global Health*², and a distillation³ give additional results on the burden of cardiovascular diseases, respiratory diseases, and diabetes. The focus is on long-term trends from 1990 to 2016, state variations, and risk factors that more or less coincide with the onset and rise of NCDs in India.

The GBD studies found that leading cardiovascular diseases—*ischaemic heart disease and stroke*—made the largest contribution to the total burden of mortality in India in 2016 (about 28%). Besides, the contribution of cardiovascular diseases to mortality rose by over 34% from 1990 to 2016, given rapid population ageing and significantly increasing levels of the main risk factors for cardiovascular diseases—high systolic blood pressure, air pollution, high total cholesterol, high fasting plasma glucose, and high body-mass index.

Some NCDs cause others and create clusters of co-morbid conditions (e.g., diabetes can lead to kidney failure and blindness). Mental health conditions are often co-morbid with each other (e.g., anxiety and depression), as well as with other NCDs (such as cancer and diabetes)⁴.

Old-age morbidity is a rapidly worsening curse in India. The swift descent of the elderly in India (60 years +) into non-communicable diseases (e.g., cardiovascular diseases, cancer, chronic respiratory diseases and diabetes) could have disastrous consequences in terms of impoverishment of families, excess mortality, lowering of investment and consequent deceleration of economic growth. Indeed, the government has to deal *simultaneously* with the rising fiscal burden of NCDs and substantial burden of infectious diseases⁵.

According to the Indian Census 2001, there are 21.91 million disabled people in India, while Census 2011 reports 26.81 million disabled people. On the other hand, the World Bank reports that there are 50–80 million disabled people in the country⁶.

Disability encompasses impairments resulting from congenital disorders, diseases, accidents, or ageing. With increasing age, several physiological changes occur, and the risk of NCDs rises. By age 60, the major burdens of disability and death stem from age-related losses in hearing, seeing and moving, as well as from NCDs. This is especially so in low- and middle-income countries⁷. Furthermore, aging takes place alongside other broad social trends that will affect the lives of older people. Economies are globalising, people are more likely to live in cities and technology is evolving rapidly. Demographic and family changes mean there will be fewer older people with families to care for them.

There is a bi-directional link between disability and poverty: disability may increase the risk of poverty, and poverty may increase the risk of disability. Households with a disabled member are more likely to experience material hardship – including food insecurity, poor housing, lack of access to safe water and sanitation, and inadequate access to health care. Poverty may increase the likelihood that a person with an existing health condition becomes disabled, for example, as the result of an inaccessible environment or lack of access to appropriate health and rehabilitation services. Although a two-way relationship between disability and poverty is often conjectured, a rigorous empirical validation has not been carried out so far⁸.

Three demographic processes are at work: declining fertility rates, increasing longevity and large cohorts advancing to old age. As both NCDs and disabilities tend to rise with age, often in tandem, the inadequacies of the present health systems, community networks and family support may magnify and render these support systems largely ineffective. If the costs in terms of productivity losses are added, the total cost burden of looking after the disabled elderly people may be enormously high in the near future. In addition, there are non-economic costs that include social isolation and stress that are difficult to quantify⁸.

Socio-economic disparities manifest themselves in different forms: ownership of assets, caste hierarchy with pervasive discrimination against lower castes (the Scheduled Castes and Tribes or SCs/STs) in education, employment, remuneration, and social exclusion. These interact in complex ways. Limited access to education lowers prospects of remunerative employment and limited funds to educate the children which results in intergenerational poverty. Evidence also suggests that even if lower caste adults have similar schooling attainments as higher caste adults, discrimination against the former results in lower earnings. Social exclusion undermines motivation for career advancement and tends to perpetuate poverty⁹. Our analysis is designed to throw new light on the associations between poverty transitions and socio-economic disparities.

The present study is a departure from the extant literature as it focuses on poverty transitions in India between 2005 and 2012, based on a rigorous econometric analysis. A nationally representative panel survey is used to throw light on who escaped poverty, who descended into poverty, the never poor and always poor, depending on whether they suffered from any NCDs and disabilities, their demographic and socio-economic characteristics and disparities, whether any conflict occurred, exposure to media and state affluence and inequality in income distribution. Although the relationship between poverty and health has been extensively studied⁴, we are not aware of any rigorous study of the associations between poverty transitions/ how poverty status changes, NCDs and disabilities and socio-economic disparities and other covariates that we consider important in themselves. This yields rich policy insights.

Section 1: Scheme

Section 2 is devoted to a literature review. First, studies that examine the links between poverty and NCDs are reviewed. These are divided into (i) studies undertaken as part of the *Lancet Taskforce on NCDs and Economics* (2018); (ii) two macro studies of the links between poverty and health; and (iii) country studies of the association between poverty and NCDs. These are chosen for their thematic relevance and analytical rigour. Second, we review the literature on the association between poverty and disabilities. Section 3 reviews salient features of a nationally representative panel survey conducted as part of India Human Development Survey 2015, on which our analyses are based. Section 4 contains the results of cross-tabulations between poverty transitions and key covariates that include assets, NCDs, disabilities, schooling, castes, among others. The econometric analyses are based on MNL probit specifications. Section 5 gives a brief algebraic exposition of the MNL probit model. Section 6 is devoted to interpretation of the results in two parts: (i) first, two minimalist MNL specifications are estimated in which poverty transitions are premised upon different measures of NCDs and disabilities and their results are reported; and (ii) second, the complete specification results are interpreted. Section 7 discusses the results from a broader perspective of their significance in relation to the extant literature. Section 8 offers concluding observations emphasising the policy challenges.

Section 2: Literature Review

Here we first elaborate the linkages between poverty and NCDs in the broad context of SDGs, followed by a review of country studies that we build on.

(a) *The SDG Context*

Many important contributions are made as part of the Lancet Taskforce on NCDs and Economics (important contributions were published in *The Lancet*, 4 April, 2018). We first review the main findings of a large-scale review¹⁰.

A detailed review of 66 studies from a wide range of countries and 13 broad NCD categories concludes that catastrophic costs of medical care are far more likely to be incurred by poor households than by wealthy households. Recurring and sometimes high treatment costs, the need for long-term care, potential intergenerational burdens, the loss of income from illness, and premature death are all common experiences for people with an NCD. The most financially susceptible people with NCDs are the uninsured and underinsured¹⁰.

(b) *The Macro Context*

An important contribution¹¹ focuses on the macro burden of NCDs in China, Japan and South Korea. The results indicate that chronic conditions are very costly in terms of lost output, with estimates of the total burden of five major chronic diseases (cardiovascular disease, diabetes, chronic respiratory disease, cancer, and mental health conditions) over the time period 2010–2013 being 7.7, 3.5 and 1 trillion USD (year 2010). Though the losses differ significantly at both aggregate and per capita levels, the NCD burden of the three countries is rather similar after adjusting for the growth potential and the income level. In this case the figures are 3.42%, 2.77%, and 3.38% of total GDP for China, Japan, and South Korea, respectively, during 2010–2030.

An earlier contribution¹² assess the contribution of health improvements, as measured by increased life expectancy, to poverty reduction in a large number of countries.

As expected, the log of GDP is negatively associated with the logistic poverty rate while its square is positively associated with it. Hence poverty diminishes with higher GDP per capita but at a diminishing rate. The log of Gini coefficient is negatively associated with the poverty rate while its square is positively associated, implying that at low levels of income inequality the poverty rate is low but at higher levels of inequality poverty rises. Although both logs of current and past health (ie, life expectancy) are considered, their results are not reported. As the predicted and actual poverty show large divergences in some cases (eg, India), it is sought to be remedied by treating the OLS residuals as estimates of fixed effects for the poverty simulations^b.

In analysing growth, the dependent variable is the annualised growth rate in per capita GDP. The log of life expectancy and the vector of independent variables are the determinants of the long-run steady states while the log of initial per capita income is meant to capture the conditional convergence effects of the distance from the steady state. The log of initial per capita income and unfavourable geography have the expected negative coefficients and both are significant while neither openness nor the dynamics in the age-distribution is significant. However, their interaction is. Life expectancy is significant while the log of working-age share of the population, the log of secondary school enrolments^c, and the measures of institutional quality are not^d.

The Gini coefficient is modelled as a function of the log of per capita income, its square, health (ie, life expectancy) and country fixed effects. The coefficient on log per capita income is positive while the coefficient on its square is negative. That is, a country becomes more unequal as it grows, except at higher incomes when the relationship inverts itself. Longer lived populations tend to be more equal.

Simulating the effect of life expectancy through growth acceleration shows a modest effect.

(c) Country Studies

Building upon an early contribution in which poverty transitions were identified and assessed with the panel survey collected by NCAER¹⁴, a more recent study¹⁵ examines these transitions in four developing countries, India, Kenya, Uganda and Peru, through life stories, ordinary negative events such as frequent illness episodes, and macro-micro links. No single factor or set of factors can explain these diverse trajectories. Another distinct but related finding is that few among those that fell into poverty in the past were able to bounce back in later years. Besides, it was not just the near-poor who were vulnerable to fall into poverty but also (relatively) affluent who fell into poverty and became persistently poor^{16, 17, 18}. Descent into poverty, resulting in long-term experiences of poverty, were observed in remote communities, located among jungles and deserts, but also in bustling towns. Macro-micro links help understand better why some households benefit while others get impoverished. A pertinent example is rise in food prices as a result of, say, shortage in wheat production globally. Assuming that the higher food price is transmitted to the food producers, they benefit while others who are net buyers of food lose. So some may escape poverty while others descend into poverty¹⁹. Elaboration of links between descent into poverty and frequent

^bIt is intriguing why OLS is used to estimate logistic regressions.

^cWe would have preferred stocks of matriculates and graduates.

^dFor detailed experiments with institutional quality indicators and their important role in poverty reduction, see a definitive analysis¹³.

negative events such as frequent illness episodes, crop diseases, expensive marriages and funerals, among others, is helpful. To assert, however, that thousands of people are one illness away from poverty, and success in reducing poverty creation is largely a question of providing more effective health care cannot be taken at face value. Besides, the fact that no standard poverty line is used limits the validity of many other conclusions (eg, micro factors matter more than macro). Finally, the author's insistence that two sets of poverty policies are required in parallel: one set of policies to help augment and accelerate escapes from poverty, and another set to prevent descents is misinformed as urban households, for example, are more likely to escape poverty and less likely to descend into poverty (details of our analysis are given later in the present study).

Another contribution²⁰ throws light on poverty transitions into and out of poverty but without analysing the role of health. The focus is on the prior characteristics of households that would predispose them to escape from or descend into poverty, comprising the socio-religious profile of these households, the economic and social resources households have to resist poverty: the household's main source of income, level of schooling, land ownership, social and financial capital, and household composition. The analysis is based on two rounds of the IHDS. A dynamic logistic regression model is used that takes as the dependent variable the poverty status (0/1) of households in time t (the 2012 IHDS survey) separately for households who were poor or nonpoor at time period $t-1$, factoring in a range of controls. Specifically, the authors run two lagged logit regressions to estimate their effects. First, they measure the odds of a person who was poor in wave one becoming non-poor in wave two, given demographic, economic and social characteristics of the household in wave one. Then they measure the odds of a person becoming poor in wave two given that the person was not poor in wave one. The main findings are that the risks of marginalized communities such as *Dalits* and *Adivasis* of falling into or remaining in poverty are higher than those for more privileged groups. Some, but not all of these higher risks, are explained by schooling, financial, and social disadvantages of these groups in 2005. However, the analysis is not satisfactory, as these transitions could be simultaneously determined in a multinomial logit or probit model, as shown in our present analysis.

(d) Poverty and Disability

As we have dealt with selected reviews of poverty and NCDs, the following focus on the relationship between poverty and disabilities.

There is a *bidirectional* link between disability and poverty: disability may increase the risk of poverty, and poverty may increase the risk of disability. Households with a disabled member are more likely to experience material hardship, including food insecurity, poor housing, lack of access to safe water and sanitation, and inadequate access to healthcare. Poverty may increase the likelihood that a person with an existing health condition becomes disabled due to lack of access to appropriate health and rehabilitation services^{21, 22}.

A recent, notable contribution²³ fills an important gap in the literature by analysing the long-term effects of a health shock on well-being in Indonesia, based on the longitudinal data from the Indonesian Family Life Survey (ILFS) covering a period of 17 years. Impacts of disability on households may be stronger in the long run than in the short term since borrowings appear to be the most recurrent coping strategy (following a health shock in LMICs in general), and in Indonesia in particular. In fact, some effects may be compounded over time. For instance,

households that rely on borrowing as a coping strategy may face high interest repayments leading them to worse material insecurity in the long term than in the short term.

This study²³ uses a fixed effects specification that addresses time-invariant heterogeneity and systematic measurement error using the ILFS longitudinal data.

Consistent with other studies of developing and developed countries, a key finding is that disability exposes households to an increase in health expenditures. Besides, there is a drop in labour income, in line with a negative impact of disability on the labour supply of the disabled as well as that of the caregiver. None of the components of expenditures escape the negative impact of disability. That is, food, education and other non-food expenditures experience a drop. It is worth noting that education expenditures are associated with the largest drop.

In sum, disability is associated with significant increase in economic deprivation.

Another notable and analytically rigorous study²⁴ throws light on the economic situation of the disabled in China. This study uses China's 2006 *Second National Survey of Disabled Persons*, a survey of more than 2.5 million individuals, to illustrate *the two-way negative relationship between income and disabilities*.

Unsurprisingly, households with persons with disabilities have lower incomes on average than households with persons without disabilities (for all types of households). Similarly, households with persons with serious disabilities tend to have lower incomes than households with persons with mild disabilities. In addition, households in urban (versus rural) areas and those with more (versus fewer) adult members have higher household incomes, on average, within each disability category (i.e., *type* and *level* of severity). Finally, households with persons with intellectual, mental, and speech disabilities have lower incomes on average than households with persons with other types of disability.

The prevalence rate of impairments is negatively related to household income throughout the income distribution. The relationship between income and disability is most pronounced at the lowest end of the income distribution with a substantial drop in the rate of disability (more than 16% to 8%) from the first to the second decile. The overall downward trend and steeper decline from the first to the second decile, in fact, exist for each main type of impairment.

For any given amount of income, households with disabled persons have a lower standard of living (SOL) than households without disabled persons, and the obverse that households with disabled persons require a greater amount of income to achieve the same SOL²⁵

Extra costs of disability as a percentage of income can be substantial (8 % to 43 %). These costs appear larger for households with fewer adults, presumably because these households rely more on outside care for the person with disability. Further, the extra costs of disability are larger for urban households than for rural households. Finally, extra costs are higher in absolute terms for households with more than one disabled person than those for households having one person with disability but less per disabled person.

After accounting for the extra costs of disability, the proportion of individuals under the poverty line, \$1 per day, increases from 12.5 % to 15.3 %.

A recent and perhaps the most detailed study⁸ estimates three equations for rural India, based on Ordered probit specifications and India Household Survey 2015: (i) factors associated with disabilities in rural areas; (ii) factors associated with duration of rural employment; and (iii) relationship between rural poverty, disabilities and other covariates^e. The principal findings are summarised below.

There is persistence of disabilities between 2005 and 2012. Disabilities in 2012 also show significant associations with NCDs, age, gender, marital status, household size, affluence, castes, and education. Somewhat surprising is the absence of significant associations between disabilities and social networks, and between disabilities and conflicts.

Disabilities, as also NCDs, are associated with lower probabilities of long duration part-time and full-time employment; women display lower probabilities of long duration part-time and full time employment; higher levels of schooling yield higher probabilities of long duration of part-time and full-time employment; wealthier households are associated with higher probabilities of long duration part-time and full-time employment; pensions yield higher probabilities of no employment or low duration employment and lower probabilities of long duration part-time and full-time employment.

Lagged middle class (ie, households in the second tercile of per capita expenditure) is associated with lower probability of being extremely poor and higher probability of being affluent in 2012, relative to extremely poor in 2005; similarly, lagged affluent yield lower probability of being extremely poor and higher probability of being affluent in 2012. Disabilities-especially the highest range- are associated with higher probabilities of extreme poverty and lower probabilities of affluence (households in the third expenditure tercile). Schooling as a form of human capital-especially higher levels of schooling-is associated with significant reductions in probabilities of being extremely poor and being in the middle class-and significant increase in the probability of being affluent. As the caste hierarchy displays vividly socio-economic disparities, the lower castes (SCs and STs) are more likely to be extremely poor. Conflicts in the village and neighbourhoods are associated with higher probabilities of extreme poverty and lower probabilities of household affluence.

In brief, there is confirmation of a two-way relationship between rural poverty and disability. Although there are a few corroborative studies for rural areas in LMICs, based on panel data and rigorous econometric models, there are none that analyse rigorously the sequence followed here: first, factors associated with rural disabilities; second, links between duration of rural employment and disability; and, finally, between rural poverty and disability. Unravelling of these links is important for policy purposes. That disability is associated with rural poverty through restricted employment and livelihood options lends considerable credibility to our analysis^f. It must, however, be emphasised that this is one important mechanism that links disability and poverty⁸. Our literature review summarised above suggests that out-of-pocket expenses involved in accessing medical care and assistive technologies (eg, wheelchair) are a huge financial burden on low income households and often result in cuts in food expenditure and malnutrition and impoverishment.

^eNote that, instead of a poverty line (the most widely used poverty line was suggested by the Tendulkar Committee in 2009)²⁶, we have used the bottom/first tercile on the basis of per capita expenditure. For further details, see the study cited⁸.

^fRecall that these three equations are separately estimated. Ideally, IV regression would have established a robust link between lower duration of employment and higher poverty. This, however, is somewhat problematic.

Section 3: Data

Salient Features of India Human Development Survey 2015

Our analysis draws upon the two rounds of the nationally representative *India Human Development Survey* (IHDS) conducted in 2005 and 2012. The IHDS is conducted jointly by the University of Maryland and the National Council of Applied Economic Research, New Delhi. The first round (IHDS-1) is a survey of 41,554 households in 2004–05. The second round (IHDS-II) involves re-interviews with 83% of the original households as well as split households residing within the same locality, along with an additional sample of 2,134 households[§]. The total for IHDS-II is therefore 42,152 households. The sample is spread across 33 (now 34) states and union territories, and covers rural as well as urban areas. Throughout the analysis, the computations are based on poverty transitions in 2012 and the 2005 age-distribution and other covariates. Repeated interviewing of the same households at two points in time facilitates a richer understanding of which households are able to partake in the fruits of growth, what allows them to move forward, and the process through which they are incorporated into or left out of a growing economy.

We have used the Tendulkar poverty cut-off which was proposed by the Tendulkar Committee in 2009. Details are given in IHDS 2015. Although widely used, it is controversial mainly because it was found to be just enough for a bare subsistence. We have used it to facilitate comparison with other studies as well as focus better on poverty transitions.

Section 4: Cross-Tabulations

Here we discuss selected cross-tabulations with the caveat that comparisons of means have descriptive value in the absence of control for confounding variables. In order to avoid *reverse* association between poverty transitions and, say, NCDs, the former are for 2012 and the latter and other covariates are for 2005. The comparisons are selective.

A list of variables used here and in the econometric analyses is given in Table 1.

Table 1
Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
Poverty Transition	2.08	3.99	0	11
Asset Index 2005				
q2	0.25	0.43	0	1
q3	0.27	0.44	0	1
q4	0.24	0.42	0	1

[§]An additional sample of 2134 households was added to IHDS-II urban areas to reduce the impact of high attrition on the standard errors of a few key variables. The simulations estimated that the attrition would increase standard errors to unacceptable levels if 8 out of 15 households were unreachable in each urban cluster. Hence, the interviewers were asked to report to NCAER supervisor if they were unable to recontact 5 or more households in a cluster. The supervisor verified the losses and randomly assigned households to the right, the left, or at the original location (for households that migrated) using a predefined rule. A similar addition to the rural sample was not attempted because of much lower attrition rate. (Personal communication by Sonalde Desai).

Variable	Mean	Std. Dev.	Min	Max
Sector				
Urban	0.27	0.45	0	1
Caste				
General	0.26	0.44	0	1
SC	0.23	0.42	0	1
ST	0.09	0.28	0	1
Household Size				
1	0.01	0.07	0	1
>5	0.44	0.50	0	1
Proportion Male (2005)				
0	0.06	0.23	0	1
>0 - 0.4	0.22	0.41	0	1
>0.6	0.33	0.47	0	1
Proportion of 60 and Plus (2005)	0.09	0.21	0	1
Highest Schooling - Adult (2005)				
Illiterate	0.24	0.42	0	1
1-5	0.16	0.37	0	1
11-14	0.11	0.32	0	1
Graduate	0.12	0.33	0	1
Proportion NCD (2005)				
>0-0.2	0.08	0.27	0	1
0.2-0.25	0.03	0.16	0	1
>0.25	0.05	0.22	0	1
Proportion Disability (2005)				
>0-0.31	0.02	0.14	0	1
0.31-0.6	0.02	0.13	0	1
> 0.6	0.02	0.15	0	1
Conflict in Village (2005)				
Yes	0.47	0.50	0	1
Number of Married Female	1.38	0.81	0	8
Number of Married Male	1.32	0.78	0	8
Radio regular Men (2005)				
Regularly	0.14	0.35	0	1
Radio regular Women (2005)				
Regularly	0.11	0.32	0	1
Newspaper regular Men (2005)				
Regularly	0.17	0.38	0	1
Newspaper regular Women (2005)				
Regularly	0.09	0.28	0	1
TV regular Men (2005)				
Regularly	0.32	0.47	0	1
TV regular Women (2005)				
Regularly	0.38	0.48	0	1
Social Network (2005)				
1	0.18	0.38	0	1
>1	0.17	0.38	0	1
Ratio Income Share Top 1% to Bottom 50 %	0.46	0.12	0.23	0.86
Net State Domestic Product	22427.79	9052.859	7914	63877

1. Computed by the authors from IHDS 2015.

First, consider the poverty transitions between 2005 and 2012. In the total sample, 66 % are never poor; about 16 % escape poverty; a little over 10.5 % descend into poverty; and under 8% are always poor.

Let us now turn to the associations between poverty transitions and asset quartiles^h. As the first quartile consists of the least wealthy and the fourth the wealthiest, our comparisons are confined to them. The largest proportion in the first quartile comprises the never poor (over 47 %), and the lowest of those who descended into poverty (over 14%), and slightly higher proportion of always poor (under 16%). Most in the fourth quartile (or, the wealthiest) are never poor (well over 90 %), followed by very small fractions of those who escaped poverty and descended into poverty (both well below 5 %), and, finally, a negligible fraction of always poor (below 1 %).

Number of persons suffering from NCDs is divided by household size. Four ranges are considered: 0/none/not suffering from NCD, >0.-0.20, >0.20-0.25, and >0.25/most burdened by NCDs. The proportion of never poor among not suffering from any NCD is a large majority (over 64.5 %), followed by those who escaped poverty, then those who descended into poverty, and, finally, always poor (over 8 %). The proportions of never poor rise across higher ranges of burden of NCDs, peaking among households with maximum burden of NCDs. The proportions of those who escaped poverty fall sharply across the ranges of NCD burden, with the lowest among the most burdened with NCDs, as also of those who descended into poverty but less sharply, again lowest among those with maximum burden of NCDs. However, and somewhat surprisingly, the low proportions of always poor fall, dropping among those with maximum burden of NCDs to under 1.5 %.

Number of disabled persons divided by household size gives the proportion of disabled. This is classified into 4 ranges: 0/non-disabled, >0-0.31, >0.31-0.6 and >0.6 (most disabled or with maximum disability). Among non-disabled households, the majority are never poor (well over 66 %), followed by those who escaped poverty, and then who descended into poverty, and, lastly, always poor (7.6 %). A similar pattern is observed among the most disabled with never poor accounting for a slightly larger majority (66.8 %), followed by a lower proportion of those who escaped poverty, and a higher proportion of those who descended into poverty, and, lastly, somewhat surprisingly a lower proportion of always poor.

Four caste categories are considered, as these manifest starkly socio-economic disparities: General, OBCs, Scheduled Castes/ SCs and Scheduled Tribes/STs. In the socio-economic hierarchy, the ranking follows the sequence in which they are listedⁱ. The SCs and STs are the lowest rungs of this hierarchy, with the latter more isolated as they are typically confined to remote, mountainous regions. Within the General category, never poor are a large majority (over 78.5 %), followed by those who escaped poverty, then those who descended into poverty, and, lastly, always poor (barely over 3 %). The proportions fall over the remaining castes, with the lowest among the STs (over 40 %). By contrast, the proportions of those who escaped poverty rise across the castes, with the highest among the STs (about 23 %). Besides, the proportions of those who descended into poverty rise across the castes, with the highest among the STs (under 14 %). Moreover, the proportions of always poor also rise across the castes, with the highest among the STs (seven times higher than among the General).

^hThese asset quartiles were constructed by the authors from the assets listed in the IHDS 2015. Details will be supplied upon request.

ⁱThe castes are considered in descending order of their socio-economic status.

Poverty transitions and highest schooling levels of adults show predictable associations. Schooling levels are classified into: illiterate, 1-5 years, 6-10 years, 11-14 years, and Graduates. Among the illiterates, the never poor are a majority (about 53%), followed by those who escaped poverty, and then those who descended into poverty and, lastly, always poor (over 13 %). In sharp contrast, among the Graduates, most (over 90 %) are never poor, followed by small fractions of those who escaped poverty and descended into poverty (under 5 %) and, lastly, the lowest of always poor (a little more than 1 %).

Location-whether rural or urban- yields interesting contrasts. Among those in rural areas, the never poor constitute a large majority (under 64 %), followed by those who escaped poverty (about 15.5 %), then those who descended into poverty (over 12 %), and, finally, always poor (under 9 %). In urban areas, the proportion of never poor is a much larger majority (about 73 %) compared with rural areas, followed by those who escaped poverty, then those who descended into poverty, and, lastly, always poor who accounted for a much smaller proportion (above 5 %).

Section 5: Multinomial Probit Model

As the poverty transitions cannot be ordered, we have used a multinomial probit (MNP) model to analyse the factors associated with the transitions. Since our analysis is based on the IHDS, which is a panel of households in 2005 and 2012, we disaggregate the poor in 2005 into these categories in 2012: *Never poor* (not poor in 2005 and 2012); *Escaped poverty* (poor in 2005 who ceased to be poor in 2012); *Descended into poverty* (not poor in 2005 who became poor in 2012); and *Always poor* (poor in both 2005 and 2012). The explanatory variables for 2005 include: asset quartile; whether General, ST, SC, OBC, Others; urban or rural; ratio of male to female; highest education level of adult males and females; proportion of household members suffering from any NCD including multimorbidity; proportion of disabled members in a households; proportion of household members 60 years and more; household size: 1, 2-5 and >5; whether belongs to a social network: none, 1, 2 or more; whether reads, listens or watches regularly mass media separately for males and females; State GDP per capita; and Piketty measure of ratio of share of top 1 % in total income to that of bottom 50 %²⁷.

A brief exposition of MNP, based upon a text-book of econometrics²⁸, is given below:

$$U_{ij} = \mathbf{x}'_{ij}\boldsymbol{\beta} + \varepsilon_{ij}, j = 1 \dots \dots J, [\varepsilon_{i1} \dots \dots \varepsilon_{ij}] \sim N[\mathbf{0}, \boldsymbol{\Sigma}].$$

The term in the log-likelihood that corresponds to the choice of alternative q is

$$\text{Prob} [\textit{choice}_{iq}] = \text{Prob} [U_{iq} > U_{ij}, j = 1 \dots \dots J, j \neq q].$$

The probability for this occurrence is:

$$\text{Prob} [\textit{choice}_{iq}] = \text{Prob} [\varepsilon_{i1} - \varepsilon_{iq} < (\mathbf{x}_{iq} - \mathbf{x}_{i1})' \boldsymbol{\beta} \dots \dots \dots, \varepsilon_{ij} - \varepsilon_{iq} < (\mathbf{x}_{iq} - \mathbf{x}_{ij})' \boldsymbol{\beta}]$$

for the J-1 other choices, which is a cumulative probability from a (J-1)- variate normal distribution. As we are only making comparisons, one of the variances in this J-1 variate structure-that is, one of the diagonal elements in the reduced $\boldsymbol{\Sigma}$ -must be normalised to 1.0. Since only comparisons are ever observable in this model, for identification J-1 of the covariances must also be normalised, to zero. The MNP model allows an unrestricted (J-1)x (J-1) correlation structure and J-2 free standard deviations for the disturbance in the model. For more than two choices, this specification is far more general than the MNL model.

The greater generality of the MNP is produced by the correlation across the alternatives (and to a lesser extent by the possible heteroscedasticity). The distribution is itself a lesser extension. An MNP model that simply substitutes a normal distribution with $\Sigma=I$ will provide virtually the same results (probabilities and elasticities). An obstacle, however, to implementing the MNP is the difficulty in computing the multivariate normal probabilities for models with many alternatives²⁸.

As the MNP coefficients are not so relevant as the marginal effects, our interpretation is confined to the latter. In the specifications used below, we have avoided interacting one explanatory variable with another primarily because there are computational and interpretational problems⁸.

Section 6: Interpretation of Results

First, we comment on the results of two minimalist MNL probit specifications, followed by the results from the complete specification. The objective here is to highlight the associations between poverty transitions and health indicators alone.

(ia) Minimalist Specification

In a minimalist specification of MNL probit model, the four poverty groups are: never poor, escaped poverty, descended into poverty and always poor. These comprise the dependent variable which cannot be ordered. The explanatory variables are NCD and disability burdens of a household. The MNL probit specification is validated by the Wald test ($\chi^2 = 324.82$, significant at ≤ 0.0 level). The marginal effects/associations are given in Table 2.

Number of persons suffering from NCDs is divided by household size, and the following categories are used: none/0 NCD, $>0.0-0.20$, $>0.20-0.25$, and >0.25 . As households without any person suffering from NCD are the largest group, it is omitted. So all results are relative to this group. The lowest range of NCDs is $>0.0-0.2$. These households are positively associated with never poor, implying that they are more likely to be never poor; they are less likely to escape poverty, and they are also less likely to be always poor. The next higher range is $>0.20-0.25$ ^j. Households in this range of NCDs are positively associated with never poor, implying that they are more likely to be never poor; they are less likely to escape poverty, but also less likely to be always poor. Those in the highest range of NCDs, >0.25 , are also more likely to be never poor; less likely to escape poverty; less likely to descend into poverty; but less likely to be always poor. It is somewhat surprising that households suffering from highest burden of NCDs are less likely to be always poor and not more likely to descend into poverty. Whether these households are more resilient in overcoming the NCDs merits further investigation.

Table 2

Minimalist MNL Probit Results on Associations between Poverty Transitions and NCDs and Disabilities

Variables	Never Poor		Escaped Poverty		Descended into Poverty		Always Poor	
	dy/dx	Std. Err	dy/dx	Std. Err	dy/dx	Std. Err	dy/dx	Std. Err
Proportion NCD (2005)								
>0-0.2	0.0565***	(0.0122)	-0.0354***	(0.0091)	0.00218	(0.0086)	-0.0233***	(0.0056)
> 0.2-0.25	0.148***	(0.0182)	-0.0891***	(0.0110)	-0.00592	(0.0137)	-0.0526***	(0.0096)

^jNote that only significant associations (≤ 0.05 level) are commented upon unless stated otherwise.

>0.25	0.220***	(0.0110)	-0.119***	(0.0071)	-0.0328***	(0.0083)	-0.0681***	(0.0040)
Proportion Disability (2005)								
>0-0.31	-0.00782	(0.0218)	0.0256	(0.0180)	-0.0209*	(0.0138)	0.00314	(0.0121)
>0.31-0.6	-0.0216	(0.0258)	-0.00156	(0.0228)	0.0139	(0.0158)	0.00931	(0.0145)
> 0.6	-0.0473**	(0.0207)	0.01	(0.0160)	0.0298**	(0.0154)	0.00751	(0.0114)
Number of Observations	39,950							

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Besides, it is intriguing why in each range of NCDs, the probabilities of being always poor are lower. One conjecture subject to validation is whether their income/expenditures diminish.

Number of persons suffering from disabilities is divided by household size to construct the following ranges: 0 disabled person/non-disabled, >0.0-0.31, >0.31-0.60, >0.60. As households without a disabled person are a large majority, they are omitted. So all results are relative to this group. Households in the lowest range of disabilities, >0.0-0.31, do not yield any significant associations except a (weak) negative association with descent into poverty (significant ≤ 0.1 level), implying that they are less likely to descend into poverty. Households in the next higher range, >0.31-0.60 do not yield any significant association. Those in the highest range of disabilities, >0.60, are less likely to be never poor; and more likely to descend into poverty (<0.05 level). Thus highest burden of disabilities is associated with restricted poverty transitions through two distinct ways: comes in the way of being never poor and associated with descent into poverty.

(ib) Alternative Minimalist Specification

In an alternative minimalist MNL probit specification, the dependent variable is unchanged. The explanatory variables, burdens of NCDs and disabilities, are defined simply as numbers of NCDs/disabilities in each household. The specification is validated by the Wald test ($\chi^2 = 292.27$, significant at ≤ 0.0 level). The marginal effects/associations are given in Table 2(a).

As the households without any NCD are the largest group, it is omitted. All results are relative to this group. Households suffering from 1 NCD are positively associated with being never poor, implying that they are more likely to be never poor; they are less likely to escape poverty; and less likely to be always poor. Households suffering from two NCDs are more likely to be never poor; less likely to escape poverty; more likely to descend into poverty; and less likely to be always poor. Households suffering from more than 2 NCDs are more likely to be never poor; less likely to escape poverty; (weakly) but less likely to descend into poverty (significant at <0.1 level); and less likely to be always poor. In the preceding two cases,

Table 2 (a)

(Alternative) Minimalist MNL Probit Results on Associations between Poverty Transitions and NCDs and Disabilities

Variables	Never Poor		Escaped Poverty		Descended into Poverty		Always Poor	
	dy/dx	Std. Err	dy/dx	Std. Err	dy/dx	Std. Err	dy/dx	Std. Err
Total NCD (2005)								
1	0.111***	(0.0094)	-0.066***	(0.0068)	-0.00509	(0.0066)	-0.040***	(0.0043)

2					-			
	0.191***	(0.0167)	-0.091***	(0.0114)	0.0360***	(0.0128)	-0.065***	(0.0049)
>2	0.200***	(0.0316)	-0.131***	(0.0143)	-0.0362*	(0.0230)	-0.0327**	(0.0203)
TotalDisability (2005)								
1	-0.0017	(0.0231)	0.0141	(0.0196)	0.000146	(0.0152)	-0.0126	(0.0116)
2	0.00285	(0.0244)	-0.0295*	(0.0191)	0.0206	(0.0168)	0.00604	(0.0138)
>2	-0.0618***	(0.0198)	0.0335**	(0.0161)	0.00824	(0.0138)	0.0201**	(0.0118)
Number of Observations	39,950							
Standard errors in parentheses.				*** p<0.01, ** p<0.05, * p<0.1				

it is observed that marginal associations with never poor are considerably larger than with always poor (in absolute values). The signs of course differ.

As households without any disability is the largest group, it is omitted. Households with 1 disability do not yield any significant associations with poverty transitions. Nor do households suffering from 2 disabilities except a (weak) negative association with escaping poverty (<0.1 level). This implies that they are less likely to escape poverty. However, those suffering from >2 disabilities yield more significant associations with poverty transitions. They are less likely to be never poor; they are more likely to escape poverty; but they are more likely to be always poor.

While there are a few differences, both minimalist specifications yield significant associations between poverty transitions and health indicators-especially NCDs. However, without controls, their robustness cannot be ascertained.

(ii) Complete Specification

In order to further check whether poverty transitions are associated with NCDs and disabilities, and socio-economic disparities, a more comprehensive specification is used. This is called the complete specification. Among other reasons, an important one is to check the robustness of the links between poverty transitions and health indicators to the inclusion of controls.

The overall specification of the MNL probit is validated by the Wald test ($\chi^2 = 4624$, significant at ≤ 0.0 level). The marginal effects are given in Table 3^k. The interpretation of the results is deliberately selective so as to ensure that key relationships are highlighted.

Table 3

Poverty Transitions, NCDs, Disabilities and Socio-Economic Disparities

Variables	Never Poor		Escaped Poverty		Descended into Poverty		Always Poor	
	dy/dx	Std. Err	dy/dx	Std. Err	dy/dx	Std. Err	dy/dx	Std. Err
Asset Quartile – 2005								
Q2	0.0465***	(0.0100)	-0.0071	(0.0085)	0.0004	(0.0073)	-0.0398***	(0.0060)
Q3	0.193***	(0.0104)	-0.0718***	(0.0089)	-0.0346***	(0.0070)	-0.0868***	(0.0063)
Q4	0.314***	(0.0109)	-0.144***	(0.0084)	-0.0608***	(0.0077)	-0.110***	(0.0063)
Sector								

^k Details of MNLprobit coefficients will be supplied upon request.

Variables	Never Poor		Escaped Poverty		Descended into Poverty		Always Poor	
	dy/dx	Std. Err	dy/dx	Std. Err	dy/dx	Std. Err	dy/dx	Std. Err
Urban	-0.0162**	(0.0073)	0.0593***	(0.0064)	-0.0422***	(0.0049)	-0.0001	(0.0047)
Caste								
General	0.0378***	(0.0080)	-0.0196***	(0.0063)	-4.7E-05	(0.0061)	-0.0182***	(0.0041)
SC	-0.0416***	(0.0086)	0.00621	(0.0076)	0.0178***	(0.0059)	0.0176***	(0.0050)
ST	-0.172***	(0.0127)	0.0434***	(0.0115)	0.0151**	(0.0088)	0.114***	(0.0096)
Household Size								
1	0.117***	(0.0291)	-0.0836***	(0.0127)	0.00802	(0.0261)	-0.0412***	(0.0061)
>5	-0.164***	(0.0074)	0.113***	(0.0067)	-0.0109**	(0.0052)	0.0614***	(0.0045)
Proportion Male (2005)								
0	0.00474	(0.0152)	0.0059	(0.0123)	0.0129	(0.0117)	-0.0236***	(0.0072)
>0-0.4	-0.0486***	(0.0081)	0.0092	(0.0070)	0.0171***	(0.0061)	0.0222***	(0.0054)
>0.6	0.0096*	(0.0076)	0.0003	(0.0064)	0.0017	(0.0055)	-0.0116***	(0.0044)
Proportion of 60 and Plus (2005)	-0.0278*	(0.0185)	-0.0087	(0.0186)	0.0304**	(0.0125)	0.0062	(0.0096)
Highest Schooling - Adult (2005)								
Illiterate	-0.0407***	(0.0092)	0.00405	(0.0074)	0.0205***	(0.0069)	0.0162***	(0.0054)
1-5	-0.0477***	(0.0095)	0.0135**	(0.0080)	0.0209***	(0.0072)	0.0132**	(0.0056)
11-14	0.0240**	(0.0124)	-0.00485	(0.0119)	-0.00233	(0.0082)	-0.0168***	(0.0061)
Graduate	0.116***	(0.0115)	-0.0601***	(0.0088)	-0.0254***	(0.0077)	-0.0309***	(0.0074)
Proportion NCD (2005)								
>0-0.2	0.0557***	(0.0118)	-0.0431***	(0.0092)	0.0092	(0.0091)	-0.0219***	(0.0057)
> 0.2-0.25	0.0406**	(0.0220)	-0.0351**	(0.0163)	0.0107	(0.0157)	-0.0162	(0.0186)
>0.25	0.141***	(0.0144)	-0.0861***	(0.0101)	-0.0076	(0.0111)	-0.0469***	(0.0075)
Proportion Disability (2005)								
>0-0.31	-0.0180	(0.0201)	0.0166	(0.0175)	-0.0072	(0.0166)	0.00829	(0.0118)
>0.31-0.6	-0.0341	(0.0255)	0.0037	(0.0236)	0.0230	(0.0183)	0.0073	(0.0144)
> 0.6	-0.0384**	(0.0196)	0.0228	(0.0167)	0.0050	(0.0134)	0.0105	(0.0123)
Conflict in Village/Town(2005)								
Yes	-0.0141**	(0.0064)	-0.0005	(0.0054)	0.0129***	(0.0048)	0.0017	(0.0038)
Number of Married Female	0.0123	(0.0105)	-0.0121	(0.0093)	0.0045	(0.0075)	-0.0047	(0.0071)
Number of Married Male	-0.0380***	(0.0105)	0.0247***	(0.0091)	0.0070	(0.0076)	0.0063	(0.0071)
Radio regular Men (2005)								
Regularly Radio regular Women (2005)	0.0263**	(0.0143)	-0.0236**	(0.0105)	0.014	(0.0115)	-0.0167**	(0.0084)
Regularly Newspaper regular Men (2005)	-0.0488***	(0.0165)	0.0211	(0.0137)	-0.00572	(0.0118)	0.0335**	(0.0134)
Regularly Newspaper regular Women (2005)	0.0545***	(0.0123)	-0.0127	(0.0100)	-0.0141**	(0.0084)	-0.0277***	(0.0081)
Regularly TV regular Men (2005)	0.0402**	(0.0161)	-0.0050	(0.0135)	-0.0211**	(0.0114)	-0.0141	(0.0134)

Variables	Never Poor		Escaped Poverty		Descended into Poverty		Always Poor	
	dy/dx	Std. Err	dy/dx	Std. Err	dy/dx	Std. Err	dy/dx	Std. Err
Regularly TV regular Women (2005)	0.0485***	(0.0114)	-0.0439***	(0.0093)	0.0137	(0.0087)	-0.0183**	(0.0081)
Regularly Social Network (2005)	0.0319***	(0.0117)	-0.0205**	(0.0101)	-0.0143**	(0.0078)	0.0029	(0.0091)
1	0.0301***	(0.0090)	-0.0310***	(0.0076)	0.0091	(0.0063)	-0.0083**	(0.0050)
>1	0.0572***	(0.0085)	-0.0415***	(0.0065)	0.0170***	(0.0065)	-0.0327***	(0.0044)
Ratio Income Share Top 1% to Bottom 50 %	0.0807***	(0.0221)	-0.0324**	(0.0188)	0.0288**	(0.0164)	-0.0771***	(0.0164)
Net State Domestic Product	1.20E-07	(0.0000)	4.50E-07	(0.0000)	-8.95e --- 07***f	(0.0000)	3.26E-07	(0.0000)
Number of Observations	35,256							

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Assets signify affluence. Different degrees of affluence are reflected in the asset quartiles. As the first asset quartile is largest, it is omitted. All marginal associations for higher quartiles are relative to the omitted quartile.

The marginal association of the second quartile with never poor is positive, implying that the probability of being never poor is higher, relative to the first quartile; while that with always poor is negative, implying a lower probability of being always poor than in the omitted quartile¹. The (absolute) values do not differ much. The associations of the third quartile vary in sign and magnitude. Relative to the first quartile, the marginal association of the third with never poor is large and positive, implying a much higher probability of being never poor. The association with those who escaped poverty is negative, implying a lower probability of escaping poverty, but also of descent into poverty. Moreover, the association with being always poor is negative, implying a lower probability of being always poor than in the omitted case. The (absolute) values of the associations with never poor are highest, and lowest for those who escaped poverty. The fourth quartile associations are similar in sign but magnitudes differ. The association with the never poor is very large and positive, implying a considerably higher probability of being never poor; it is negative with those who escaped poverty, implying a lower probability of escaping poverty, as also with those who descended into poverty. Between the two, the (absolute) value of the former is higher. The association with always poor is also negative, implying a lower probability of being always poor, relative to the first quartile. It is indeed striking that the marginal associations with never poor rise across the three quartiles, as also the (absolute) values of associations with always poor.

Number of persons suffering from NCDs is divided by household size to construct the ranges. As those not suffering from any NCD are a large majority, this group is omitted. So all results are relative to this omitted group. Those in the range, >0-0.20, are positively associated with never poor, implying that they are more likely to be never poor; they are negatively associated with those who escaped poverty, implying that they are less likely to escape poverty; and, lastly, they are also less likely to be always poor. Those in the next range of NCDs, >0.20-0.25, are also positively associated with never poor, implying that these households are more likely to be never poor; but they are less likely to escape poverty. Somewhat surprisingly, those in the highest range of disabled persons, >0.60, are positively

¹We comment only on marginal effects that are significant at ≤ 0.05 level unless stated otherwise.

associated with never poor, implying they are more likely to be never poor; these households are negatively associated with escape from poverty, implying that they are less likely to escape poverty, as also always poor. Although NCDs are found to result in loss of jobs, lower earnings, and out-of-pocket expenses which are often impoverishing, our results do not portray such a grim poverty outcome.

In the first minimalist specification, with the same measure of NCDs as in the complete specification, households in the lowest range of NCDs, $>0-0.2$, are more likely to be never poor, less likely to escape poverty, and less likely to be always poor. Similar results are obtained for the next higher range of NCDs, $>0.20-0.25$. Households in the highest range, >0.25 , are more likely to be never poor, less likely to escape poverty, and less likely to descend into poverty. However, these are not consistent with the results from the complete specification. In the alternative minimalist specification using the number of NCDs per household, relative to households without any NCD, those with one NCD are more likely to be never poor, less likely to escape poverty and less likely to be always poor. Those suffering from 2 NCDs, are more likely to be never poor, less likely to escape poverty, less likely to descend into poverty and less likely to be always poor. Similar results are obtained for households suffering from more than two NCDs. Although not directly comparable with the previous specification, these are intriguing results.

Similarly, proportion of disabled at the household level are computed. As non-disabled are a large majority, they are omitted. So all results are relative to this omitted group. It is indeed surprising that none of the ranges of disabled households yield significant associations except the largest, >0.60 , which is negatively associated with never poor, implying that the most disabled households are less likely to be never poor.

In the first minimalist association with the same specification of disabilities as in the complete specification, those in the highest range of disabilities, >0.60 , are less likely to be never poor, and more likely to descend into poverty. In an (alternative) minimalist specification, we get different results. Instead of dividing disabled persons by household size, we consider number of disabilities in a households. Those suffering from >2 disabilities yield more significant associations with poverty transitions. They are less likely to be never poor; they are more likely to escape poverty; but they are more likely to be always poor. Although not comparable to the previous set, these results are more plausible.

In brief, while the NCD results seem robust, the disability results are less so with controls.

A demographic variable of considerable interest is proportion of old in a household measured as number of members 60 years old or more/household size. This shows a positive association with those who descend into poverty, implying that the larger the proportion of elderly in a household, the more likely it is to descend into poverty. If they are also more likely to be unemployed, this is plausible.

As OBCs are the largest caste category, it is omitted. All results are therefore relative to this caste group. The General group is positively associated with being never poor, implying that they are more likely to be never poor; this caste group is negatively associated with those who escaped poverty, implying that these households are less likely to escape poverty; but less likely to be always poor. The SCs are negatively associated with being never poor, implying that they are less likely to be never poor; more likely to descend into poverty, as also more likely to be always poor. The STs are negatively associated with being never poor,

implying that they are less likely to be never poor. Indeed, as the (absolute) value of the association is large, the likelihood of being never poor is considerably larger. They are more likely to escape poverty but also more likely to descend into poverty; moreover, as the association with being always poor is large and positive, they are also considerably more likely to be always poor. Between the two extremes, being never poor and being always poor, the STs are more unlikely to be never poor than likely to be always poor.

Location of households is divided into rural and urban. As the former exceed the latter, rural households are omitted. All urban results are therefore relative to the rural. As urban households are negatively associated with being never poor, it implies that these households are less likely to be never poor; they are more likely to escape poverty and less likely to descend into poverty. Evidently, the latter two are a manifestation of greater employment opportunities in urban areas.

As schooling adds to skills and awareness of remunerative employment opportunities, and value of healthy living, we have classified households on the basis of highest schooling of an adult in a household (>21 years). The largest and therefore the omitted group is of adults with 6-10 years of education. So all results are relative to this group. Illiterates are negatively associated with being never poor, implying that they are less likely to be never poor; they are also more likely to descend into poverty; and, more likely to be always poor. Those with 1-5 years of education are less likely to be never poor; but they are more likely to escape poverty; as also descend into poverty; lastly, they are more likely to be always poor. Matriculates and above (11-14 years) are more likely to be never poor; and less likely to be always poor. Graduates are more likely to be never poor; they are less likely to escape poverty but also less likely to descend into poverty; and, lastly, less likely to be always poor. Thus higher schooling offers much better prospects of being never poor, and lower likelihoods of descending into poverty, and of being always poor.

As the villages/towns which did not experience any conflict exceed those that did, the former are the omitted category. So all results are relative to villages/towns which did not experience any conflict. The association of conflicts with never poor is negative, implying that the households in such areas are less likely to be never poor; and it is also interesting to note that descent into poverty is more likely.

Social networks are many and varied, as they include self-help groups, religious groups, producers' associations and others. As it is difficult to analyse these groups individually, we have classified household affiliation into: none/not networked, 1 and >1 networks. As households without any affiliation are the largest group, this is the omitted group. Hence all results are relative to this group. Affiliation to 1 network is positively associated with being never poor, implying that such household are more likely to be never poor; however, such households are less likely to escape poverty but less likely to be always poor. Those belonging to 2 or more networks are more likely to be never poor, less likely to escape poverty, more likely to descend into poverty, and less likely to be always poor. If some networks are more heterogeneous in terms of membership, mere membership of more than 1 network may not help escape poverty and avert descent into it. If upper castes are overrepresented and those more vulnerable to poverty such as the SCs are a minority, for example, they may be left to fend for themselves in a crisis.

Mass media vehicles have been disaggregated into radio, newspaper and television. Listening, reading and watching, respectively, are broken up by gender. These are also

distinguished into “never”, “sometimes” and “regularly”. Merging never and sometimes makes it the largest group. Hence, as appropriate, all results are for regularly relative to not regularly which for each medium is the largest group, and, hence the omitted group. Men listening regularly to radio are more likely to be never poor, less likely to escape poverty but less likely to be always poor. By contrast, women listening regularly to radio are less likely to be never poor, and more likely to be always poor. Men reading newspapers regularly are more likely to be never poor, and less likely to descend into poverty and less likely to be always poor. Women reading newspapers regularly are also more likely to be never poor, and less likely to descend into poverty. Men watching tv regularly are more likely to be never poor, less likely to escape poverty but less likely to be always poor. Women watching tv regularly are also more likely to be never poor, less likely to escape poverty but also less likely to descend into poverty. If some of the associations appear weaker for women, for example, regular reading of newspapers is not associated with lower probability of being always poor, the clue lies in their inability to take advantage of their better awareness, enforced by family and social norms.

Somewhat surprising is the absence of significant associations between state affluence measured in terms of (net) state domestic product per capita and poverty transitions except in the case of descent into poverty. The association is negative, implying that the greater the affluence, the less likely it is for a household to descend into poverty. However, the marginal association is infinitesimally small.

The Piketty measure of income inequality (ie, the ratio of share of top 1 % in total income to that of the bottom 50 %) at the state level is positively associated with a household being never poor, implying that the greater the inequality, the more likely it is for a household to be never poor; it is, however, less likely to escape poverty, more likely to descend into poverty, and less likely to be always poor²⁹.

As emphasised here, changes in poverty rate/head-count ratio are made up of how many descended into poverty and how many escaped poverty. In other words, the poor are a heterogeneous and evolving group over time and analysis such as ours throws light on the transitions into and out of poverty and thus helps us understand who are involved in these movements and the associated factors. A specific contribution of the present study is thus whether and how health indicators such as NCDs and disabilities, along with socio-economic disparities, are associated with specific transitions. The study is enriched by the associations between poverty transitions and socio-economic disparities reflected, for example, in the caste hierarchy. Another salient feature of our analysis is the associations between poverty transitions and exposure to mass media by gender. Finally, raising doubts about state affluence “trickling down” to the poor, we have demonstrated that extreme inequality at the state level has considerable relevance in explaining poverty transitions. As our literature survey shows, most studies are confined to whether poverty increased or remained unaffected by adverse health conditions. We focus specifically on the evolution of poverty/or poverty transitions over time. However, there are a few serious limitations. One is that since we have access to just two waves of the panel survey, we are not able to allow for unobservable heterogeneity between households. Allowance for such heterogeneity could change some findings. Another is that we have not analysed the two-way relationship between health and poverty. Our focus here is mainly on how NCDs, disabilities, socio-economic disparities are associated with poverty transitions and not the *reverse* association. An IV regression model would capture the reverse association as well but it is difficult to implement it in an unordered probit/logit model. Finally, in the reduced form regression, we are unable to

distinguish between productivity and earning losses due to NCDs and disabilities, and catastrophic out-of-pocket medical expenses of households with members suffering from NCDs and disabilities resulting in households descending into poverty and / or making it harder for them to escape poverty.

Section 7: Discussion

Here our focus is on the significance of our findings.

Whether we go by the minimalist specifications or the complete, we find a *few* robust associations between poverty transitions and NCDs. To elaborate, those in the NCD range, $>0-0.20$, are positively associated with being never poor, implying that they are more likely to be never poor; they are negatively associated with those who escaped poverty, implying that they are less likely to escape poverty; and, lastly, they are also less likely to be always poor. Similar results are obtained for the next higher range of NCDs, $>0.20-0.25$. Although NCDs are found to result in loss of jobs, lower earnings, and out-of-pocket expenses which are often impoverishing, our results do not portray such a grim poverty outcome, as compared with, say, those¹⁰ that focus on impoverishment through exorbitant out-of-pocket health care expenses^m. However, these studies while important tend to overlook capacity for bouncing back through, for example, more women going out to work, younger members working longer hours, and social support.

It is indeed surprising that none of the ranges of disabled persons in a household are significantly associated with poverty transitions except the highest ($>.60$) which is negatively associated with never poor, implying that they are less likely to be never poor. In the minimalist specification, however, these households are not just less likely to be not poor but also more likely to descend into poverty. In an alternative minimalist specification, with number of disabilities per person, those suffering from more than 2 disabilities are less likely to be never poor; they are more likely to escape poverty, but they are more likely to be always poor. Although these minimalist specifications are not directly comparable, their results seem more plausible. So, in brief, the links between poverty transitions and disability are not so robust with controls.

However, in another recent study⁸, based on the rural sample from IHDS, disabilities show a robust association with rural poverty, measured as those belonging to the bottom third of households on the basis of per capita expenditure. While complementing an important study²³ of the long-term effects of a health shock on well-being in Indonesia, based on the longitudinal data from the Indonesian Family Life Survey (ILFS) covering a period of 17 years, our previous study⁸ focuses on a short period of seven years. Besides, we are unable to comment on whether the short-term coping strategy compromises long-term well-being. On the broad theme of poverty and disability, an innovative study²⁴ offers strong corroborative evidence for China. The prevalence rate of impairments is negatively related to household income throughout the income distribution. The relationship between income and disability is

^mA not-so-recent review of evidence³⁰ draws attention to the varied links between poverty and NCDs. NCDs can hamper development and poverty reduction efforts in developing countries. A decrease in working-age population participation in the labour force, due to short and long term disability, will reduce productivity and, in turn, reduce per capita GDP growth. Government budgets will be squeezed as tax revenues fall because of a decline in the size of the working-age population and an increase in the needs and demands of a disabled and aging population. In addition, as the elderly population rises, the overall rate of saving and investment in a society will decline as more resources need to go to pensions, health care, and long-term residential care.

most pronounced at the lowest end of the income distribution with a substantial drop in the rate of disability from the first to the second decile. The overall downward trend and steeper decline from the first to the second decile, in fact, exist for each main type of impairment.

In the complete specification, we take other covariates of poverty transitions into account—such as socio-economic disparities including levels of affluence, lower castes’ social and economic deprivation and overall extreme income inequality, media exposure and whether social networks act as a cushion against contingency (major illness, fall in income, crop losses).

Since the MNL probit solution did not converge with poverty in 2005 as an explanatory variable, we replaced it with asset quartiles in the same year. This helps us understand better the relationship of poverty status in 2012 with wealth in 2005. To avoid repetition, we are selective here. The marginal association of the second quartile with never poor is positive, implying that the probability of being never poor is higher, relative to the first quartile (the omitted group); while that with being always poor is negative, implying a lower probability of being always poor. Relative to the first quartile, the marginal association of the third with being never poor is large and positive, implying a much higher probability of being never poor. The association with those who escaped poverty is negative, implying a lower probability of escaping poverty, as also with those who descended into poverty. Moreover, the association with being always poor is negative, implying a lower probability of being always poor than in the omitted case. The important points are that while greater wealth acts as a barrier to descent into poverty, it also comes in the way of escaping poverty. We have reported elsewhere that NCDs show a wealth gradient⁴. In other words, the wealthier segments are more vulnerable to NCDs than the least wealthy. So depending on the NCD and the hospitalisation the out-of-pocket expenses would be greater. This could explain why many households in the third asset quartile are poor and find it harder to escape poverty.

Demographic variables show significant associations with poverty transitions. One is the share of the aged (60 years or more/household size). There is a positive association with those who descend into poverty, implying that the larger the proportion of elderly in a household the more likely it is to descend into poverty. Decline in physical stamina and dexterity together with limited incomes/pensions and lack of family support render them highly vulnerable to any illness shock. This is not a new but important finding as SDG1 aim to “End poverty in all its forms everywhere” hinges on addressing the specifics of poverty in old age¹.

Socio-economic hierarchy is frequently measured in terms of the caste hierarchy^{8, 9, 20}. This hierarchy is closely associated with poverty and poverty transitions. Our analysis shows that the General group is more likely to be never poor; less likely to escape poverty; and more likely to descend into poverty as well as less likely to be always poor. The SCs are negatively associated with never poor, implying that they are less likely to be never poor; more likely to descend into poverty, as also more likely to be always poor. The STs are less likely to be never poor; they are more likely to escape poverty but also descend into poverty; moreover, as

¹A UN study³¹ observes that the risk of old age poverty is generally more pronounced in less developed countries where social protection coverage is inadequate or absent, and where many older persons rely only on family support. However, amidst socioeconomic pressures and increased longevity, customary family-based support is very often far from sufficient and reliable, with a significant number of older persons at greater risk of either falling into poverty or remaining below the poverty line.

the association with being always poor is large and positive, they are also considerably more likely to be always poor. Between the two extremes, never poor and always poor, the STs are more unlikely to be never poor than likely to always poor. As the SCs and STs are the bottom rungs of socio-economic hierarchy-the latter more so because of their social and physical isolation-these findings help us understand better why their upward mobility remains restricted and poverty persists despite economic growth and affirmative action (eg, quotas for them in education and employment). In an earlier contribution⁹, based on a decomposition of inequality and poverty in rural India, we argue that in addition to lack of endowments (eg, land and education), the SCs and STs get lower returns to such endowments compared to non-scheduled households. Often, lower returns are interpreted as a measure of discrimination against these disadvantaged groups. Despite some reduction in the household expenditure disparity between 1983 and 1999, these differences persist^o. While some elements of current discrimination ought not to be overlooked, we argue that part of the differences in returns is also attributable to how caste and ethnic identity undermines motivation^p. This is particularly important in designing affirmative action that remains confined to ensuring places in educational institutions, government employment and legislatures.

Schooling's role in poverty transitions is studied in a recent study²⁰. However, as noted earlier, pair-wise comparisons of poverty transitions are somewhat problematic. Using the MNL probit specification, we get more interesting insights. We have classified households on the basis of highest schooling attainment of an adult in a household (>21 years). Relative to those with 6-10 years of schooling, illiterates are less likely to be never poor; they are more likely to escape poverty; but they are also more likely to descend into poverty; and more likely to be always poor. Those with 1-5 years of education are negatively associated with never poor, implying that they are less likely to be never poor; but they are more likely to escape poverty; as also descend into poverty; lastly, they are more likely to be always poor. Matriculates and above (11-14 years) are more likely to be never poor; and less likely to be always poor. Graduates are positively associated with being never poor, implying that they are more likely to be never poor; they are less likely to escape poverty but also less likely to descend into poverty; and, lastly, less likely to be always poor. As our earlier studies show^{4,8}, high levels of schooling are associated with better protection against NCDs and prevention of disabilities and above all reduction of the prospects of extreme poverty. So an important contribution of the present study is to elaborate the links between poverty transitions and high level of schooling. It may be noted that schooling levels are also important markers of socio-economic disparities.

Manifestations of social capital are found in social networks that often work to the benefit of the disadvantaged, old men and women, and other vulnerable groups. Households affiliated to 1 network are more likely to be never poor; however, such households are less likely to escape poverty and more likely to descend into poverty. But such households are also less

^oOur decomposition shows that the poverty among the SCs and STs is higher both because of differences in characteristics and returns on them. However, it is a matter of policy concern that much of the deprivation of the STs is linked to lower returns, given their location in remote, inaccessible areas with weak infrastructural support.

^p Let us distinguish between historical and *current* forms of discrimination. Referring to our decomposition of poverty incidence gaps, the differences in endowments could be a result of historical discrimination, for example, social exclusion of the SCs and STs restricted their access to education over a long period of time, and in turn restricted their children's access to it. The differences in returns to endowments, on the other hand, may reflect discretionary valuation of performance and thus elements of current discrimination. But this is somewhat simple in so far as current performance may also be shaped by personal motivation and identity in complex ways⁹.

likely to be always poor. Those belonging to 2 or more networks are more likely to be never poor, less likely to escape poverty, more likely to descend into poverty, but less likely to be always poor. That these networks matter a great deal in the lives of old men and women in India is demonstrated in an important contribution³², based on LASI. In fact, it is argued that older men and women *both* give and receive support. This is particularly true with regard to financial support. Older men and women are not only at the receiving end of support, but also contribute to the dynamic and interdependent aspects of social institutions. This bidirectional force is often less recognized as societies begin to have larger older populations with a resultant undue emphasis on the burden of older people in rapidly evolving societies such as India.

Poverty transitions depend critically on information and awareness from various channels such as family, friends, social networks and mass media. An important contribution of our study is that it highlights the strong associations between poverty transitions and exposure to mass media of men and women.

Men listening regularly to radio are more likely to be never poor, less likely to escape poverty but less likely to be always poor. However, women listening regularly to radio are less likely to be never poor, and more likely to be always poor. Men reading newspapers regularly are more likely to be never poor, less likely to descend into poverty and less likely to be always poor. Women reading newspapers regularly are more likely to be never poor, and less likely to descend into poverty. Men watching tv regularly are more likely to be never poor, less likely to escape poverty but less likely to be always poor. Women watching tv regularly are also more likely to be never poor, less likely to escape poverty but less likely to descend into poverty. If some of the associations appear weaker for women (eg, listening to radio regularly), the clue lies in their inability to take advantage of their better awareness, enforced by family and social norms. Attitudes and behavioural changes take time to evolve. However, one recent analysis³³ argues that the experience of being employed could also help a woman and her family members realize that working is compatible with a satisfying family life and brings unanticipated benefits. While the majority of teachers reported that when they accepted the job their families were concerned about their working, they also reported that these concerns had diminished over time.

Conflicts can take many forms: riots, caste violence, and labour unrest. Our analysis brings out their associations with poverty transitions. Two significant associations are found between poverty transitions and occurrence of conflicts in the same village/town. The association of conflicts with never poor is negative, implying that the households in such areas are less likely to be never poor; and it is also interesting to note that descent into poverty is more likely. As such conflicts have risen in frequency and intensity, they entail loss of livelihoods, destruction of assets, deaths and injuries and consequently descent into poverty. An interesting contribution³⁴ illuminates a key channel through which conflicts result in extreme poverty. By removing labour market opportunities, conflict deepens poverty: it is likely to create more chronically poor (in terms of increasing the likelihood of spending a long period in extreme poverty, as well as cutting short the lives of those whose survival was guaranteed only by access to poorly paid seasonal/temporary agricultural wage labour). If we go by the examples of rural Brazil and India, no less serious is the fact that the problems do not vanish with the formal end of organised armed conflict.

The poverty transitions also may depend on the macro-economic environment. Two variables are considered: one is net state domestic product per capita and the second is the Piketty

measure of inequality (ie, ratio of share of the top 1% in total state income to share of the bottom 50 %).

Somewhat surprising is the absence of significant associations between state affluence measured in terms of (net) state domestic product per capita and poverty transitions except in the case of descent into poverty. The association is negative, implying that the greater the affluence, the less likely it is to descend into poverty. However, the marginal association is infinitesimally small. This is surprising as there is abundant evidence showing that the greater the affluence the lower is poverty. In other words, in the absence of income inequality, affluence “trickles down” to the poor^{16,19,29}.

So the associations between poverty transitions and the Piketty measure of income inequality are of critical importance. The Piketty measure of income inequality at the state level is positively associated with being never poor, implying that the greater the inequality, the more likely it is to be never poor; it is, however, less likely to escape poverty, more likely to descend into poverty, but less likely to be always poor. As this measure of inequality is driven largely by the growing wealth of multimillionaire/*crorepatis*, who have benefited from the real estate boom and speculation in the share market, it is unlikely to create remunerative employment opportunities. This lends plausibility to lower likelihood of escaping poverty and greater likelihood of descending into poverty. In fact, an earlier study²⁹ found that the Piketty measure of poverty is positively associated with FGT class of poverty indices.

Section 8: Policy Perspective

From a broader policy perspective, health sector interventions must be combined with other interventions elsewhere¹⁰. The effectiveness with which health systems protect households from the economic burden of NCDs therefore depends on wider government programmes aimed at promoting economic growth, social mobility, and alleviating poverty through safety nets such as basic employment rights, free education, and income support programmes.

The growing menace of NCDs in a context of rapidly aging population in India calls for bold policy initiatives. Although such initiatives are not lacking, they are either underfunded or limited in coverage and uncoordinated³⁶. These assume greater significance as the Indian family as an elderly support mechanism is under growing stress, owing to a combination of fewer adult children, the elderly living longer and often with disability, migration for work, increasing healthcare expenses, and other financial costs of supporting elderly relatives.

In order to prevent and control major NCDs, the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS), was launched in 2010 with a focus on strengthening infrastructure, human resource development, health promotion, early diagnosis, management and referral.

Although there are no immediate policy goals to ensure population-based screening, opportunistic screening of selected chronic diseases is an important strategy under NPCDCS. However, surveillance activities under this programme are inefficient due to funding constraints, weak operational guidelines and inadequate clinical, technical and managerial staff. It is imperative that public health system devote additional resources towards active population-based surveillance.

A National Health Policy was announced in 2017. It proposed raising public health expenditure progressively to 2.5% of the GDP by 2025 and advocated a major chunk of resources to primary health care, followed by secondary and tertiary health care. This policy together with the NITI Aayog action agenda have set targets for reduction of premature death and morbidity due to major NCDs in India. There are two serious concerns, however. One is that scant attention is given to where the resources will come from. Another glaring omission is that little is said about the rapid rise in the share of the old in the total population and associated multi-morbidities of NCDs. Besides, continuing neglect and failure to anticipate these demographic and epidemiological shifts-from infectious diseases to NCDs-may result in enormously costlier policy challenges¹⁰.

Given the rapid deterioration in the quality of public healthcare and rising life expectancy and expectations of good quality health care, the supply –demand imbalance is likely to widen sharply. So the first priority is to hike substantially expenditure on health. But more important than higher financial allocation is reorganisation of the health care system and effective regulation. As argued emphatically in an important study³⁶, it is imperative to develop a fully integrated population- based healthcare system that brings together the public and private sectors and the allopathic and indigenous systems, and is well-coordinated at different levels of service delivery platforms-primary, secondary and tertiary. Moreover, a case is made for a shift from a standard health insurance model to an entitlement-based model.

The Ayushman Bharat Yojana (ABY), launched in 2018, is a partial response. It offers much larger inpatient benefits in the amount and conditions covered in its hospital insurance component, covers more people (almost 500 million or the poorest 40% of India's population), places no limits on household members covered, and seeks to address gaps in outpatient services in the form of almost 150,000 health and wellness centres spread throughout the country. Geriatric services are planned at these centres. Assuming, for example, that hospital utilisation rates of the bottom 40% of Indians rise to the level of the top quintile (following the introduction of benefits under ABY), this would result in an extra cost of almost 1,000 billion rupees for 500 million Indians, almost 12 times the current budgetary provision for ABY. The funding remains a major concern.

ABY benefits will only accrue to the elderly if they are aware of the programme benefits and in a position to use them. This can be especially problematic for the poor disabled elderly or the very old, who are often left out of social transfer schemes for which they are eligible^{36,37}. Although the focus is on the less well-off, neither the state health insurance plans nor ABY make special provisions for targeting households containing the elderly.

As individual-level risk factors are influenced by broader environmental, economic, infrastructural and social conditions, addressing these risk factors requires multisectoral action by agencies beyond ministries of health. In particular, creating environments that facilitate greater physical activity and allow for affordable and healthy dietary choices as complementary goals may be beneficial⁷.

Behavioural changes are no less important and perhaps also no less challenging. A few important contributions using evidence from LMIC and from India yield useful insights⁸. Lack of physical activity and unbalanced high-calorie diet promote weight gains. Obesity is a risk factor for cardiovascular and diabetes and can aggravate symptoms of CVD such as emphysema and bronchitis³⁸. Limiting tobacco consumption is expected to benefit at the individual level but wider reduction in multi-morbidity prevalence requires taxation on

unhealthy products. For example, there is evidence that tobacco taxation reduces smoking and such benefits might also lead to a reduction in certain multi-morbidity clusters³⁹. It is reassuring therefore that taxation of *beedis* and smokeless tobacco (SLT) has risen sharply in the recent Goods and Services Tax (GST)⁹.

Drawing upon a recent study⁸, guided by United Nations (UN) Convention on the Rights of Persons with Disabilities (UN-CRPD or CRPD), several LMICs have legislated to protect and mainstream the disabled. In fact, there is no dearth of legislation that encompasses a range of penalties against discrimination in access to health care, employment, education, and violence against women, elderly and tribes/castes at the lower rungs of socio-economic hierarchy. It suffices to give a few illustrative examples of legislation in conformity with CRPD in India.

India enacted the Rights of Persons with Disabilities Act, 2016 (the “New Act”) and the rules thereunder (the “Rules”) in 2017. The New Act replaced the Persons with Disabilities (Equal Opportunity Protection of Rights and Full Participation) Act, 1995 (the ‘previous Act’), which covered only seven disabilities. The New Act covers more than 15 disabilities including dwarfism, acid attack victims, intellectual disability and specific learning disability. It defines a ‘person with disability’ as someone with long term physical, mental, intellectual or sensory impairment which, in interaction with barriers, hinders his / her full and effective participation in society equally with others.

Yet discrimination persists in various forms - in employment, access to financial services, health services-specifically, against women, elderly and tribals⁴⁰.

As life expectancy has risen and fertility has reduced, it is not surprising that the share of the aged (60 years or more) has risen rapidly. The co-occurrence of NCDs and disabilities poses a considerably higher risk of mortality. Yet more than moderate proportions of the elderly work as self-employed, book-keepers and in other physically less demanding occupations. But their well-being is threatened by younger members of the family migrating to urban areas for more rewarding employment opportunities, leaving them behind to fend for themselves. Given the stigma of disability, their restricted ability to access health care and doubts about their employability, social networks (eg, self-help groups, women’s associations, religious groups, charities, producers’ groups) could help both financially and informationally as well as help overcome the social stigma against them. While old-age pensions, and pensions for widows are potentially helpful, the amounts paid and persons covered are miniscule. However, if the analysis in a recent study⁸ has any validity, larger amounts of pensions and grants could also act as a disincentive to engage in job search and remunerative employment.

Schooling –especially high levels of schooling of adults (> 10 years)- are associated with not just health improvements including lower incidence of NCDs and disabilities but also with poverty transitions-especially as they are more likely to be never poor, less likely to descend

⁹On this, see, two recent contributions to the *Lancet* Taskforce on NCDs and Economics^{1,39}. The second contribution³⁹, for example, argues that concerns about higher taxes on tobacco, alcohol, and sugar-sweetened beverages harming the poor might be overstated. Taking many factors into account (consumption patterns, responsiveness to price changes, potentially averted medical costs, opportunities to use revenue to mitigate unintended effects on the poor, and the overall financial effect of tax increases), there is no reason to believe that price policies will be regressive.

into poverty and less likely to be always poor. So much higher public investments are necessary to promote high levels of schooling.

Awareness and information could bring about behavioural changes conducive to healthy living and expand remunerative employment opportunities. Our analysis of regularly listening to radio, reading of newspapers and watching tv –both by men and women—are associated with poverty transitions. For example, men watching tv regularly are more likely to be never poor, less likely to escape poverty but less likely to be always poor. While women watching tv regularly are also more likely to be never poor, less likely to escape poverty but also more likely to descend into poverty. If some of the associations appear weaker for women, the clue lies in their inability to take advantage of their better awareness, enforced by family and social norms. An important concern here is better and more frequent portrayal of poverty and self-censorship by mass media to avoid misinformation and exaggerated official claims of drastic reduction of poverty.

Paradoxically, cooperation today depends on whether cooperative action was successful in the past. The latter may be associated with shared norms of fairness, reciprocity and trust in a community. Whether such norms will be observed in vertical social networks (as observed in horizontal ones, involving people of similar status and power) is debatable⁴¹. In the Indian context, for example, caste hierarchies act as a barrier to cooperative or collective action. Such barriers are often compounded by economic inequalities. Some evidence, however, suggests that if the prospective gains are large, the disadvantages of a socially heterogeneous membership (including the disabled) may be overcome⁴².

The growing wealth/income inequality depicted by the Piketty measure is insidious as it comes in the way of upward mobility of the poor, and is positively associated with descent into poverty and being always poor. As the wealth accumulated by the multimillionaires/*crorepatis* is due largely to real estate and speculative gains in the share market, redistribution of assets and progressive income taxation would help constrain the wealth accumulation. However, politically as well in terms of disincentives to invest, these proposals are likely to be highly controversial. So moderate redistribution combined with rapid expansion of gainful economic activities may have greater support.

In brief, the policy challenges are daunting but the policy shifts suggested may be helpful in developing a more inclusive and fair economy.

References

1. Niessen, L. W., D. Mohan, J. K. Akuoku, A. J. Mirelman, S. Ahmed, T. P. Koehlmoos, A. Trujillo, J. Khan & D. H. Peters ((2018) “Tackling socioeconomic inequalities and non-communicable diseases in low-income and middle-income countries under the Sustainable Development agenda”, *Lancet* 391: 2036–46.
- 2 a. India State-Level Disease Burden Initiative Collaborators (2017), “Nations within a nation: variations in epidemiological transition across the states of India, 1990–2016 in the global burden of disease study”. *Lancet*. **390**: 2437–60.
- 2.b India State-Level Disease Burden Initiative CVD Collaborators (2018) “The changing patterns of cardiovascular diseases and their risk factors in the states of India: the Global Burden of Disease Study 1990–2016”, *Lancet Glob Health*, published on-line September, 12.
- 2.c India State-Level Disease Burden Initiative CRD Collaborators (2018) “The burden of chronic respiratory diseases and their heterogeneity across the states of India: the Global Burden of Disease Study 1990–2016”, *Lancet Glob Health*, published online Sept 12.
3. Arokiasamy, P. (2018) “India’s escalating burden of non-communicable diseases”, *Lancet*, October
4. Kulkarni, Veena S., Vani S. Kulkarni & R. Gaiha (2019) “Persistence of Non-Communicable Diseases, Affluence and Inequality in India”, University of Pennsylvania Population Center Working Paper (PSC/PARC), 2019-30. Change 27 into 4.
5. Bloom, D. E., E.T. Cafiero-Fonseca, M. E. McGovern & K. Prettner (2014a). “China and India’s Descent into Chronic Disease: Killing Themselves Slowly,” *Milken Institute Review*, 2nd Quarter, 24-33.
6. World Bank (2007) People with Disabilities in India: From Commitments to Outcomes, Human Development Unit, South Asia Region.
7. WHO (2015) *World Report on Ageing and Health*. Geneva.
8. Gaiha, R., S. Mathur, and Vani S. Kulkarni. 2020. "Rural Poverty and Disability in LMICs." University of Pennsylvania Population Center Working Paper (PSC/PARC), 2020-47.
9. Gaiha, R., G. Thapa, K. Imai, & Vani S. Kulkarni (2008) “Has Anything Changed? Deprivation, Disparity Discrimination in Rural India”, *The Brown Journal of World Affairs*, XIV/11, Spring/Summer.
10. Jan, S. Tracey-Lea Laba, B. M. Essue, A. Gheorghe, J. Muhunthan, M. Engelgau, A. Mahal, U. Griffiths, D. McIntyre, Q. Meng, R. Nugent, R. Atun (2018) “Action to address the household economic burden of non-communicable diseases”, *Lancet*; 391: 2047–58.
11. Bloom, D.E., S. Chen, M. Kuhn, M. E. McGovern, L. Oxley, K. Prettner (2020) “The economic burden of chronic diseases: Estimates and projections for China, Japan, and South Korea”, *The Journal of the Economics of Ageing*, forthcoming.
12. Bloom, D., D. Canning, B. Graham & J. Sevilla (2006) “Improving health: A key to halving global poverty by 2015”, Chapter 5, (Eds) M. Agosin, D. Bloom, G. Chapelier, J. Saigal, *Solving the Riddle of Globalization and Development*, Abingdon, England.
13. Imai, K., Gaiha, R., and Thapa, G. (2010) ‘Is the Millennium Development Goal of Poverty Still Achievable? Role of Institutions, Finance and Openness’, *Oxford Development Studies*, 38(3), pp.309-337.
14. Gaiha, R. (1988) “Income Mobility in Rural India”, *Economic Development and Cultural Change*, Vol. 36, No. 2, pp. 279-302.
15. Krishna, A. (2007) *One Illness Away*, Oxford University Press, New York.
16. Gaiha, R. (1989) “Poverty, Agricultural Production and Prices in Rural India-A Reformulation”, *Cambridge Journal of Economics*, 13/2.

17. Gaiha, R., and A. Deolalikar (1993) “Persistent, expected and innate poverty: estimates for semi-arid rural South India, 1975–1984”, *Cambridge Journal of Economics*, 17/4.
18. Gaiha, R. & K. S. Imai (2004) “Vulnerability, shocks and persistence of poverty: estimates for semi-arid rural South India”, *Oxford Development Studies*, 32/2.
19. Gaiha, R. (1995) “Does Agricultural Growth Matter in Poverty Alleviation?”, *Development and Change*, 26/2.
20. Thorat, A., R. Vanneman, S. Desai, & A. Dubey (2017) “Escaping and Falling into Poverty in India Today”, *World Development*, 93: 413–426.
21. *Lancet* (editorial, 2019), “Prioritising disability in universal health coverage” *Lancet*, 394/10194, 187.
22. Negrini, S., C. Kiekens, A. W. Heinemann, L. Özçakar, W. R Frontera (2019), “Prioritising people with disabilities implies furthering rehabilitation”, *Lancet*, December 2.
23. Simeu, N, & S. Mitra (2019) “Disability and household economic wellbeing: evidence from Indonesian longitudinal data”, *Oxford Development Studies*, 47/3.
24. Loyalka, P., L. Liu, G. Chen, X. Zheng (2014) “The Cost of Disability in China”, *Demography*, 51/1: 97-118.
25. Sen, A. (2004), “Disability and justice”, In Disability and Inclusive Development Conference, Keynote speech. Washington, DC: World Bank.
26. The Tendulkar Committee Report (2009) *Estimation of Poverty in India*, Planning Commission, New Delhi.
27. Piketty, T. (2013) *Capital in the Twenty-First Century*, Harvard University Press, Cambridge, MA.
28. Greene, W. H. (2012). *Econometric Analysis*. 7th Edition. London: Pearson.
29. Kulkarni, Varsha, S. and R. Gaiha (2018) “Beyond Piketty: a new perspective on poverty and inequality in India”, GDI Working Paper 2018-033. Manchester: The University of Manchester.
30. Engelgau, M., S. Rosenhouse, S. El-Saharty, A. Mahal (2011) “The Economic Impact on Households and Nations of NCDs: A Review of Existing Evidence”, *Journal of Health Communication* 16(Suppl 2).
31. UNDESA (2015) “Income Poverty in Old Age: An Emerging Development Priority”, Department of Economic and Social Affairs programme on ageing, New York.
32. Berkman, L. T.V. Sekher, B. Capistrant, and Y. Zheng (2012), “Social Networks, Family, and Care Giving Among Older Adults in India”, Chapter 11, (eds.) J. P. Smith & M. Majumdar (2012), *Ageing in Asia, Findings from New and Emerging Data Initiatives*, National Academies Press, Washington DC. USA.
33. Dean, J. T. & S. Jayachandran (2019) “Changing Family Attitudes to Promote Female Employment”, Papers and Proceedings, *American Economic Review*, May.
34. Cramer, C. (2009) “Violent conflict and the very poorest”, CPRC, Working Paper 129, University of Manchester, England.
35. Chatterjee, P. (2017). “The Health System in India: the Undeserved Majority,” *Lancet*, vol. 390, November.
36. Patel, V., R. Parikh, S. Nandraj, P. Balasubramaniam, K. Narayan, V. K Paul, A. K. Shiva Kumar, M. Chatterjee, K. Srinath Reddy (2015), “Assuring health coverage for all in India”, *Lancet*; 386: 2422–35.
37. Hoffman, K. J. (2014) “Non-communicable diseases in South Africa: A challenge to economic development”, *South African Medical Journal*, 104.

38. Academy of Medical Sciences (2018). “Multi-morbidity: A Priority for Global Health Research,” London.
39. Sassi, F., A. Belloni, A. J. Mirelman, M. Suhrcke, A. Thomas, N. Salti, S. Vellakkal, C. Visaruthvong, B. M. Popkin, and R. Nugent (2018) “Equity Impacts of Price Policies to Promote Healthy Behaviours”, *Lancet*, May 19; 391, 2059–2070.
40. Council for Social Development (CSD 2017) *India: Social Development Report 2016*, Oxford University Press, New Delhi.
41. Putnam, R. (1993). *Making Democracy Work: Civic Traditions in Modern Italy*, Princeton University Press, NJ.
42. Gaiha, R. (2003) “Decentralisation and Poverty Reduction”, in (Eds). E. M. Pernia and A. B. Deolalikar, *Poverty, Growth and Institutions in Developing Asia*, Palgrave Macmillan, Hampshire.