

Aging and Death under a Dollar a Day

Abhijit V. Banerjee and Esther Duflo¹

Massachusetts Institute of Technology, NBER and CEPR

August 15, 2007

Abstract

This paper uses household survey data from several developing countries to investigate whether the poor (defined as those living under \$1 or \$2 dollars a day at PPP) and the non-poor have different mortality rates in old age. We construct a proxy measure of longevity, which is the probability that an adult's mother and father are alive. The non-poor's mothers are more likely to be alive than the poor's mothers. Using panel data sets for Indonesia and Vietnam, we also find that older adults are significantly more likely to have died five years later if they are poor. The direction of causality is unclear: the poor may be poor because they are sick (and thus more likely to die), or they could die because they are poor.

¹ We warmly thank the National Institute of Aging (Grant #P01-AG005842), MIT, the Center for Health and Wellbeing at Princeton University, and the World Bank for funding. Dhruva Kothari, Remi Jedwab and Stefana Stancheva provided outstanding research assistance. Many thanks to Angus Deaton for providing important comments on an early draft.

“He who is contented is rich.” – Lao Tzu, Chinese Taoist philosopher
“I’ve been rich and I’ve been poor. Believe me, rich is better.” – Mae West, American actress.

Introduction

Despite the many assurances from many wise men that being rich is not all that it is made out to be, most economists remain firmly in Ms. West’s camp. This is partly no doubt an item of faith not unrelated to what makes people want to be economists. But mostly it reflects the suspicion that, at least up to a point, what are usually called necessities of life are really necessary, and having to do without them cannot be pleasant.

To what extent are the poor deprived of the necessities of life? Obviously this turns on who we call the poor. One popular definition, which we adopt, is to focus on those who have a daily per capita expenditure of a dollar a day (at PPP) or less. We call them the very (or extremely) poor to distinguish them from the merely poor, who live on less than \$2 a day. In a previous essay (Banerjee and Duflo, 2007a), we used household surveys from thirteen countries and draw on existing research to look at what the poor can afford. From these it appears that even the extremely poor can afford to buy enough calories to keep going, though whether they always prioritize that over other things they could buy is not entirely clear. At least in some countries there seems to be evidence that the extremely poor are actually short on calories and other nutrients, relative to the standard norms for their country. In India, the poorest seem to live on less than 1500 calories a day compared to a norm of over 2000, and moreover, this number seems to be going down over time. Where there is more detailed health information, such as in a survey we carried out in rural Udaipur district (Banerjee, Deaton and Duflo (2004)), it is also clear that the very poor betray signs of undernourishment: 65% of adult men and 40% of adult women have BMIs under 18.5, which is the standard cut-off for being underweight.

How do the very poor do in terms of other necessities? Most of them seem to have a place to stay and some minimal clothing—what else should we be looking for? Perhaps one way to answer that is to look at some of the things that the people immediately richer than them seem to have, that they may not. This is one of things that we did in Banerjee and Duflo (2007b): we used the same surveys to compare the poor with two groups of slightly richer people in the same countries. These are households whose daily per capita expenditures valued at purchasing power parity (henceforth, DPCE) are between \$2 and \$4 and those whose DPCE are between \$6 and \$10. While clearly much better off than the very poor, and much better placed in the consumption distribution of their respective countries, these are still poor households by developed country standards: the poverty line in the US for someone who lives in a family of five, for example, works out to be about \$13 per day.

Compared to the poor, the less poor spend more per visit to the doctor and more per child educated. They are more likely to send their children to school, more likely to see a doctor when they feel sick, and more inclined to see a private doctor rather than a public practitioner. They also have much greater access to water, sanitation and public infrastructure: the fraction with tap water at home increases with DPCE in most countries (and in some countries by quite a large margin): from 12% (for the extremely poor) to 73% (for those with DPCE between \$6 and \$10) in rural Cote d'Ivoire, 2% to 63% in rural Tanzania and 12% to 55% in Nicaragua. In urban areas, in seven countries out of the nine for which we have data, 70% or more of the households with DPCE between \$6 and \$10 have tap water, whereas the share is below 50% in all countries but one for the extremely poor. The same pattern holds for latrines (where the share of those who have latrines among the households with DPCE between \$6 and \$10 is above 80% in seven countries) and electricity (the share that has access to electricity in this group is above 90% in seven countries).

These differences obviously suggest a better quality of life for the less poor, though these surveys cannot tell us what, if anything, they are giving up in terms of connectedness in

the community or the consumption of leisure (for all it is worth, when asked in surveys, the non-poor always report more life satisfaction than the poor). Do we also see cruder, more tangible, differences between them, say in terms of differences in the risk of dying? And if so, by how much? It is known (see e.g. Wagstaff, 2002) that infant mortality is greater among the poor than among the richer households. Is the same true among adults? This is the set of questions that we set out to answer here.

Data sources

We mainly used the Living Standard Measurement Surveys (LSMS) conducted by the World Bank and the “Family Life Surveys” conducted by the Rand Corporation, all of which are publicly available.² We have data for 15 countries from these sources: Brazil, Bangladesh, Cote d’Ivoire, Guatemala, India, Indonesia, Mexico, Nicaragua, Pakistan, Panama, Papua New Guinea, Peru, South Africa, Tanzania, and East Timor. In addition, we also use two surveys that we conducted in India with our collaborators. The first was carried out in 2002 and 2003 in 100 hamlets of Udaipur District, Rajasthan (Banerjee, Deaton, and Duflo, 2004). Rural Udaipur is one of the poorer areas of India, with a large population of tribals (the term used in India to designate people who used to be so low in the Hindu caste hierarchy that they had no official place in it) and an unusually high level of female illiteracy (at the time of the 1991 census, only 5 percent of women were literate in rural Udaipur). Our second survey covered 2,000 households in “slums” (or informal neighborhoods) of Hyderabad, the capital of the state of Andhra Pradesh and one of the boomtowns of post-liberalization India (Banerjee, Duflo, and Glennerster, 2006). We chose these countries and surveys because they provide detailed information on extremely poor households around the world, from Asia to Africa to Latin America, including information on what they consume, where they work, and how they save and borrow.

² See Frankenberg and Karoly (1995), Frankenberg and Thomas (2000), Strauss et al (2004).

From each of these surveys we compute the consumption per capita in PPP terms, using the 1993 purchasing power parity (PPP) as the benchmark.³ We identify the extremely poor as those living in households where the consumption per capita is less than \$1.08 per person per day, as well as the merely “poor” defined as those who live under \$2.16 a day using 1993 purchasing power parity (PPP) as benchmark. In keeping with convention, we call these the \$1 and \$2 dollar poverty lines, respectively. For comparison, we then added two additional groups: those living between 2 and 4 dollars a day, and those living between 6 and 10 dollars a day.

Age pyramids: Missing old people?

One first approach (although we are going to see its limitations shortly) to get at the question of “excess” mortality is to look at the age distribution of the population: is the number of older people in the population unusually low?

Tables A1 and A2 in the appendix show the fraction of the sample that lives under 1 dollar a day, under 2 dollars a day, between 2 and 4 dollars a day, and between 6 and 10 dollars a day, in different age groups.⁴ Tables 1 and 2 show summary ratios: the fraction of young (less than 18) in the population, and the ratio of those over 50 over all adults (21+), broken down by gender and for the overall population.

The first striking (and well known) fact is that the very poor form a remarkably young group. The ratio of the population under 18 over the total population among the rural extremely poor range from 40% (Indonesia) to 60% (Panama). In urban areas it ranges from 34% (Indonesia again, in 2000) to 63%. This ratio falls substantially in all countries as people get slightly richer, although it remains high even then (it ranges between 35%

³ The use of consumption, rather than income, is motivated by the better quality of the consumption data in these surveys (Deaton, 2004).

⁴ In this and all that follows, the observations are weighted by the survey weights if appropriate (multiplied by household size when the data is first aggregated at the household level) so that these should be estimate of population means.

and 42% for those with DPCE between 6 and 10 dollars a day in rural area, and 28% to 42% for the urban areas).

Part of the reason is of course that fertility is high among the poor, and as a result there are a lot of children. But there are also comparably few older people. The ratio of people aged 50 and above to adults over 20 among the rural extremely poor ranges between 15% (in Papua New Guinea) to 34% (Indonesia, 1997). Compared to other indicators of how the poor live, it is actually strikingly similar across these countries, clustered around 20% for most of them. In the US, the corresponding ratio was 38% in 2000 (2000 census). This in itself is however not sufficient to conclude that the poor die more in developing countries than people do in the US, since the fertility rates are also higher in poorer countries. As a result the number of younger people at any point in time is mechanically higher, compared to the number of older people in those countries, compared to in the US. So these “missing old people” may just be people who were never born.

Is there an income gradient in the ratio of older people over the total number of adults within countries? In most countries, the ratio of old people over all adults is similar when we look at either the poor or the extremely poor. However, in nine countries out of fifteen, in the rural areas, there are comparatively more old people among the slightly more well off people (\$2-\$4 and \$6-\$10) than among the poorer people: For example, in Udaipur district (rural India) the ratio of old to adults increases from 22% among the poor to 34% among those living on between \$2 and \$4 dollars a day. Likewise in Peru, the ratio increases from 24% to 31% in the same categories (in both countries, we have too few people with DPCE between \$6 and \$10 to give meaningful statistics). We get similar numbers for Pakistan and Vietnam . In Nicaragua and Panama respectively, it increases from 22% to 35% between the extremely poor and those living between \$6 and \$10, and in Panama it increases from 25% to 35% in the same categories. In all those countries, the ratio of old to prime-age adults among the more well off is almost similar to what it is in the US, despite the fact that these people are still very poor by US standards, and despite the much better public health environment in the US.

In four other countries (Guatemala, Indonesia, Mexico and Tanzania), the ratio does not change with income. In the remaining two---South Africa and Ivory Coast---it actually falls sharply (from 27% to 19% in rural South Africa, for example). One thing that is common across these six countries is that the ratio of people in the 0-18 age group compared to older people does not vary a lot between the extremely poor and those living between \$6 and \$10 a day. This difference ranges from 2% (South Africa and Guatemala) to 10% (Indonesia) in these six countries, whereas it ranges from 10% (Papua New Guinea) to 30% (Brazil) in the other countries. While the share of those less than 18 today is a very imperfect proxy for the difference in fertility rate in the past, this suggests the possibility that a part of the reason why some countries have many more young adults compared to older adults among poorer people, is that the poorer people in those countries have relatively more children.

The fact that three of the countries where we see a distinct pattern are in Africa points to another general limitation of this exercise: We may be confusing the location decision of the older people with the fact that they may be alive or not. For example in South Africa, older people may live with their grandchildren while the parents are away working. Unless they are receiving a pension (which is available after 60 for women and 65 for men), the per capita consumption of such households might be particularly low (since they have many children and no prime-age worker) compared to households without older people.

A different choice of location may in turn explain the pattern we found in the other countries: it is conceivable that older people choose to live with their richer children, which would make the ratio of older people to adults artificially low among the poorest. Of course, since we find the ratios are similar among the extremely poor and the poor, and they start to differ only when we look at various categories, this does not seem very likely, since it is not very likely that many old people have some children living under \$1 a day and others above \$2. But since we have no data on this, this remains a possibility.

A new measure of adult mortality: Are your parents alive?

Given that the age structure data turns out to be quite hard to interpret, it is fortunate that, for a subset of countries, there is a way to address this problem: In some of the household surveys (11 countries in total), the household roster contains a question on whether each member's father and mother are alive. For these countries, we present in table 3 the fraction of those aged 35 to 50 whose father and mother are alive. These fathers and mothers are likely to be above 50 (if they are alive), giving us a handle, albeit approximate, on how the entire population of those aged 50 and above changes across the different income categories. Note that to the extent that richer people have children later, and that the children of richer people are rich as well, this will under-estimate any difference in the age-adjusted mortality, since the parents of richer people aged between 35 and 50 will tend to be older.

In table 3A, we show the data for urban and rural households together (although in some countries the data is available only for rural households. For women, there is a fairly clear pattern: in four countries (Udaipur, Pakistan, South Africa and Bangladesh), the probability that the mother of the respondent is alive does not really change between the richest category for which we have data and the poorest one. In all the other countries, it goes up with DPCE, and the difference between the richest and the poorest category for which we have data ranges from 6 percentage points in Vietnam to 23 percentage points in East Timor.

In most of the last group of countries (countries where the probability of a person's mother being alive is higher in the richest group than in the poorest), the pattern is one of a monotonic increase. The probability that the respondents' mother is alive goes up as DPCE goes up, though in some countries we only see a sizeable gap among the most well off (e.g. Brazil), while in others the critical break seems to be in the \$2 and \$4 range (e.g. Mexico), and yet in others there is a steady increase across all the groups (e.g. Indonesia in 1993).

For fathers, there is no clear picture: in seven surveys (but only five countries, since Indonesia appears three times), the probability of the father being alive increases between the richest and the poorest category. In four countries it declines. In two it is roughly constant.

The gender gap here might reflect differences in the nature of the health problems faced by men and women in their 50s and 60s. First, those men are older (since men have children older than women), and their mortality naturally catches up across the age group (since eventually everybody dies). Second, in these age groups, men often die of heart disease, lung cancer, diabetes and high blood pressure, all of which may be related to their pattern of consumption, and therefore potentially be more of a risk for those who can afford to consume more. This is less true of women. Alternatively, it could be pointing to a reverse causation. Young adults whose father is alive may be younger and hence poorer, while since mothers tend to be younger and in any case have a higher life expectancy at 40, having a mother alive may not be a signal of her son's age. Below, we solve this problem by controlling for the respondent's age.

Looking at urban and rural dwellers separately (the interpretation of which is complicated, since the urban dwellers may be migrants whose parents were themselves rural dwellers), we reach similar conclusions: in rural areas, in Pakistan, Udaipur and Bangladesh the probability of an individual's mother being alive is roughly constant between the poorest and those with DPCE between \$2 and \$4 (we do not have richer people in the surveys in rural areas in those countries). It increases across category everywhere else, and the difference usually lies between 10 and 20 percentage points. For example, in Brazil the proportion of rural dwellers whose mother is alive increases from 63% to 72% across those two categories. In Indonesia it increases from 52% to 65%. In Mexico it increases from 57% to 74%, etc...

For fathers, once again, there is no obvious pattern: the probability of the father being alive is greater among the richer households in seven surveys (and five countries), roughly constant in two, and decreasing in four countries.

And finally, for urban dwellers, in Nicaragua and South Africa the probability of the mother being alive declines somewhat as we go towards richer households; it is roughly constant in three surveys, and increases in six. For men, we have a clearer pattern than for the rural areas: the probability decreases only in Pakistan. Elsewhere it is either roughly constant (Indonesia in 1993, Nicaragua and Vietnam) or increasing (everywhere else).

Another way to look at this data is to perform simple descriptive regressions. We present in table 4A and 4B the results of logit regressions where a dummy indicating whether a respondent's mother (or father) is alive is regressed on the respondent's age and age squared, as well as country dummies and indication of the economic welfare of the household. We present country-by-country regressions in table 4A and, to save space, we focus on the pooled rural and urban data and one specification: economic welfare is regressed on the log of total monthly per capita expenditure expressed in 1993 PPP dollars. This table confirms the pattern revealed by the descriptive statistics for mothers, and gives somewhat stronger results for men: There is an insignificant, sometime mildly negative, relationship between the probability that a respondents' mother and father are alive in Udaipur, Pakistan, and Bangladesh (except for a significant *negative* relationship between the probability that the father is alive and monthly per capita expenditure in Udaipur). Elsewhere, the coefficients are positive, and in most cases significant at least at the 10% level (except in the first wave of the IFLS for both mothers and fathers, for mothers in Cote d'Ivoire, and for fathers in Indonesia, 2000).

Finally, to summarize all the patterns in this section, we present in table 4B regression using data from all the countries pooled together (all the regressions control for a set of country dummies).⁵ In panel A, death is regressed on the logarithm of monthly capita expenditure (expressed in 1993 PPP dollars) in panel A, and the consumption categories in panel B. In panel B, we exclude the "below 2" dollars a day category, so that the coefficients should all be read in relation to those between \$1 and \$2 dollar a day. Overall, we do see a strong association between log (monthly per capita expenditure) and

⁵ As well as the IFLS wave for Indonesia

the probability that one's mother is alive, with similar coefficients in rural and urban areas. For fathers, the relationship is also strong overall, but insignificant in rural areas. Even in rural areas, however, those with DPCE between \$6 and \$10 are more likely to have their father alive, relative to the poor.

This data, which does not suffer from the obvious problems of fertility differential and endogenous locations, suggests that, conditional on reaching adulthood, the poor are significantly less likely to reach old age than the less poor.

This obviously does not rule out the possibility that the dearth of older people in poorer households is also partly driven by the decision of which child to live with. Table A3 looks at this question directly: we ask whether poorer or richer adults are likely to have their parents live with them, conditional, obviously, on the parents being alive. The answer to this question, interestingly, turns out to vary quite a lot across countries. In the rural areas of six countries out of 12, mothers are more likely to live with their grown up children among households with DPCE between \$2 and \$4. In one country (Pakistan), the ratio is more or less constant. Within countries, the effect of income is not monotonous: out of the seven countries where children who are between \$2 and \$4 dollars a day are more likely to have their mother living with them than the poor, in all but one of the ones for which we have data for the \$6 to \$10 dollars a day group, the share is lower for that last group than for the \$2-4 group. The pattern for men is somewhat different: there are in fact two cases (Bangladesh and East Timor) where the probability of co-residence decreases in income for men while increasing for women.

Note that out of the six countries where the ratio of old to young among adults was lower among the rich than among the poor, we have information on whether parents are alive and where they live for five. Out of these five countries, four (Mexico, Indonesia, South Africa, and Ivory Coast) are also countries where richer children were less likely to live with their mother than the extremely poor. This suggests that the choice of residence among the old people might have explained at least a part of why there seem to be "missing" older people in poorer households.

To our knowledge, there is very little evidence on adult mortality by income groups in developing countries. For the reasons discussed above, age pyramids cannot be used to generate such evidence, and it is rare to have data on mortality and on poverty status in the same data sets. This quick panorama based on whether parents are alive seems to establish that in many countries, at least among women, the poor have higher adult mortality than the non-poor (of course it does not tell us anything about the key question of causality---do the poor die or are the dying poor?)

The best way to establish whether the poor really die more than the non-poor, however, is to use a panel data set to measure the mortality of those identified as poor over the next few years. It is not possible for most of our countries, but there are three where the necessary panel data is available: Udaipur (India), Indonesia (IFLS), and Vietnam.

Age specific mortality rates: Indonesia-Vietnam-India

The Indonesian Family Life Survey is a panel, of which three waves have already been completed: the first one was fielded in 1993, the second in 1997, and the last one in 2000. For all waves, a lot of effort went into tracking down most of the respondent households (Frankenberg, Thomas and Smith, 2003). When a household was re-interviewed in the second or third phase, the entire household roster was carefully updated: the interviewers worked with a pre-printed list of household members, and asked for each member whether he/she still lived in the household and whether he/she is still alive. In addition, we know if all the members of a given household died.

The Vietnam living standard measurement survey is a two wave panel, fielded in 1992/93 and 1997/1998. As in the Indonesian family life survey, the 1992/1993 household roster was updated for all households that were part of the panel in 1997/1998, with information for each member of whether they died in the intervening period.

Finally, the Udaipur survey will eventually also be a five year-panel, allowing us to carry out the same exercise, but the endline survey has not been collected yet. Two data sources are available for now: first, a comprehensive update of the household roster was completed after one year. Second, each household is interviewed once a month to monitor health status and health seeking behavior, and if anyone died, this is also indicated in this survey. This survey has been going on for two years (in this version, we only use the 1 year out mortality).

For all three surveys, we adopted the same method: we determine poverty status in the first wave of the survey; then we compute the probability to have died by the next survey, in different age groups, and notably among the older members.

Table 5 presents the results for Indonesia: in all age groups, there is very little difference in death rates between the poor and the extremely poor, but the non-poor are less likely to die than the poor and the extremely poor. This is true both five years out and ten years out, and in both rural and urban areas. In rural areas, depending on the age group and whether we look at five to ten years out, the extremely poor are 1.4 to 5 times more likely to die than those who live between \$6 and \$10 dollars a day.

In terms of percentage points (and even in terms of ratio of percentages, for the rural areas at least) the largest difference between the poor and the non-poor is seen for the five-years out death rates of those aged 50 plus in rural areas. Overall, 15.3% of those who were 50 and above in 1993 have died by 1997 among the extremely poor. The number is very similar among all the poor (15.8%) but much lower among those who were living between \$6 and \$10 a day (7%). The difference is particularly striking in rural areas (15% versus 3%) and still large in urban areas (18% versus 11%).

By 2000, the ratios are much less skewed (22% versus 17% in the overall population), suggesting that, among the richer households, many of the people who did not die by 1997 have died in the meantime. This is as we might have expected. Clearly by 2050, for example, the ratio would be 100% in all income groups.

The patterns are strikingly similar in Vietnam (table 6). There again, the percentage who died decline with economic welfare in all age groups, and this decline is particularly steep among the older age group, in the rural areas. Overall, 14.4% of those aged 50 and above who lived in extremely poor households in 1992/93 have died by 1997/98, versus 9.8% among those who were living in households with DPCE between \$6 and \$10. In rural areas, the probabilities are respectively 15% and 5%. These numbers are very close to the Indonesian numbers, and suggest that those numbers are unlikely to be just due to chance: above 50, it seems the rural extremely poor are at least three times more likely to die than the less poor.

It should be noted that those ratios indicate high mortality rates among the old, compared to the USA: for example, in the HRS, 6% of the sample aged between 50 and 59 in the first wave had died by 1998 (in six years).⁶

The results we have for Udaipur are not directly comparable to the results for Vietnam and Indonesia, for two reasons: the mortality is only after one year, and there are almost no households in the sample with consumption per capita between \$6 and \$10 a day. Given the number of observations in each group, and for more clarity we present the results for three groups: the extremely poor, those with DPCE between \$1 and \$2, and those with DPCE above \$2.

Despite these differences, the patterns we find in Udaipur are entirely consistent with those for Indonesia and Vietnam. Here again, in all age groups, the mortality is higher for the extremely poor than for the poor and the non-poor. And once again, the largest difference in percentage point are found among the older people: The probability of dying within a year is 5.8% for the extremely poor, 4.6% for the poor, and 3.4% for those with DPCE above \$2.

⁶ It should be noted that the HRS 1992 sample is younger, since only individuals ages 50 to 59 were sampled. The unweighted average age in the HRS 1992 sample is 55.26, versus 62.6 among all those aged 55 or above in the Vietnamese survey.

In all three countries, death rates are thus higher for the poor at all consumption levels, and in particular for the old. This higher mortality among the old is particularly striking given that the poor tend to die more at every age, and therefore the surviving old poor might be selected to be particularly healthy. One possible interpretation is that the difference in lifestyle in this group, albeit incremental, does generate these differences in mortality rates. Another possibility (and possibly both co-exist) is that poor health is disabling, and responsible for maintaining those households in poverty.

Aging , Health and Poverty in India and Indonesia

To shed more light on these rather concerning statistics about death, we now examine the correlation of age and health status among the poor and the less poor in two of the surveys where we conducted the mortality analysis, where we also have detailed health data: Udaipur and Indonesia.

For the two countries, we simply plot non-parametric regressions of a number of health and mental health indicators on age separately by gender and by income groups: In Udaipur we plot these graphs for the extremely poor (less than a dollar a day), the poor (\$1 to \$2 a day) and the non-poor (more than \$2 a day). In Indonesia, we plot these graphs for the extremely poor, the poor, those with DPCE between \$2 and \$4 and those with DPCE between \$6 and \$10. Note that this cross-sectional correlation may underestimate the deterioration of health with age (relative to a panel where people would be compared over time), since the weakest people presumably disappear from the sample as they age. Given the differential mortality we have described among the poor and non-poor, this implies that there is a stronger negative bias among the poor than the non-poor, and therefore that, everything else equal, we will tend to under-estimate any differences in the slope of health with respect to age between the groups.

The indicators we look at are body mass index, hemoglobin levels and anemia (defined as less hb below 12 g/dl for women and 13g/dl for men), lung capacity (measured as the maximum of three peak flow meters reading), self reported health status, number of

activities of daily living that the person carries out with difficulty or not at all (excluding eating, dressing, and going to the bathroom), and self reported well being (which is available only in Udaipur). In addition we have signs of depression, measured differently in both surveys: in Udaipur it is defined as the answer to the question “In the last twelve months, was there a period of at least one month where you felt worried, tense or anxious”. In Indonesia it is the number of symptoms over the last four weeks from among: having difficulty sleeping, being bothered by things, feeling lonely, being sad, being anxious, having difficulty concentrating and finding everything an effort.

In Udaipur (Udaipur figures, figures 1A to 12B), for most indicators, health seems to deteriorate more strongly with age among the poor than the non-poor. Starting with women, BMI for example, decreases with age, for the poorer categories, while it does not among the non-poor. Anemia rises much more steeply with age among the extremely poor than among the poor and it does not increase with age for the non-poor. The same pattern can also be seen for self reported health status, number of symptoms of acute morbidity, self reported well being, and symptoms of depression over the last year. The only variables that do not follow this pattern are the ADL limitations, the peak flow meter reading, and the time spent in squatting and getting up for 5 times (as well as the inability or refusal to do it). Interestingly, the patterns for males are similar for all the objective measures, and different for the self reported measures (self reported health status, number of symptoms, symptoms of depressions). The responses to this last set of questions do not always indicate a deterioration with age, and when they do, the slopes are similar for the extremely poor, the poor and the non-poor. The only exception is self reported well being, which actually is positively correlated with age for the 60 and 80 for the two richer categories, and negatively for the poorest. It could be because men, and in particular older men, are more reluctant to complain. Alternatively, given the Indian context, it is quite likely that older women are substantially less well treated than older men, which could increase both their likelihood of being depressed and their vulnerability to various ailments.

On the whole, in Udaipur, a simple story can be told: as they get older, the poor get comparably weaker and weaker, and they are also more likely to die. Again, it could be that they were always frail (which is why they were poor), and so support age less well, or it could be that poverty accelerates age's damage on the body.

The same analysis for Indonesia does not reveal a similar pattern for all the objective variables, where the slopes are very similar for the poor and non-poor. Hemoglobin levels, if anything, are positively correlated with age among the poor, and negatively among the non-poor. But here again, we find that women's self reported health status, depression symptoms, number of health complaints over the last months, all worsen more with age for the poor than for the non-poor (note that in this data, a higher value for self reported health status variables indicate *worse* health, not better). And once again, this is not true for men.

Unlike Udaipur, there seems to be some tension between the health indicators and the actual mortality in rural Indonesia. One can offer different conjectures for this phenomenon. If one is prepared to take the subjective indicators seriously, one possible explanation is that the "objective" indicators we have here (anemia, BMI, lung capacity, time to squat and ADLs) are indicative of chronic conditions, which are often incurable, at least for older people. However, because of their better access to sanitation and good health care, the rich are less likely to be susceptible to acute conditions (hence the differential age slopes for the number of symptoms they report), and also perhaps less likely to die from them, in part because they are more likely to be treated (for example an untreated cold for an older person may turn into a pneumonia and kill them, while a younger person would recover from it). Another possibility, if one thinks that the "subjective" measures reveal more about the psychology of the respondent than about their real health status, is that the older poor people become comparatively unhappier with age (the IFLS do not seem to have self reported happiness indices, but they do have depression indicators for the past month and the old poor women are much more likely to have those symptoms –figure 9A), which is also why they report more symptoms and

worst self reported health status. If this is true, they may then be less likely to effectively fight illnesses, which, in turn, make him or her more likely to die.

Discussion and interpretation

This chapter brings together various pieces of evidence which all point in the same direction: the poor, and particularly the extremely poor, have a lower chance of survival than those who are somewhat more well-off. We have not tried to disentangle the direction of the causality: these adults could be poor because they are in poor health, which would then in turn explain why they are more likely to die. Or alternatively, being poor could make them more likely to die. And of course both directions of causality may be true at the same time. It is worth pointing out, however, that most old people in developing countries live with other, younger, adults: in Vietnam for example, this is true of 80% of the older adults. And if we restrict the sample to only those people who do live with a younger adult, we find the same excess mortality rate among the poorer old people than in the entire sample.

This weakens the case for a direct link going only from the health of the old people to the poverty status of the household. This point is further strengthened by the fact that when we look at older women in households where there are prime age adults, we continue to find the same pattern (in Vietnam, for example, for women above 50 who live with prime-age adults, the five-year mortality rate goes from 12% among the poor to 7.7% among those with DPCE between \$6 and \$10). Since older women in households with prime-age adults are very unlikely to be engaged in any market work, it is unlikely that it is because they are unhealthy that the household is poor. To the extent poor health is in part inherited, it could of course be the case that unhealthy old people live with unhealthy younger adults, and this is the reason why the household is poor.

On balance, we are tempted to interpret the evidence accumulated in this paper as revealing, at least in part, that poverty does kill.

Bibliography

Banerjee Abhijit, Angus Deaton and Esther Duflo (2004), "Wealth, Health, and Health Services in Rural Rajasthan," *American Economic Review*, 94 (2): 326-330.

Banerjee, Abhijit. and Esther Duflo (2007), "The Economic Lives of the Poor," *Journal of Economic Perspectives*, 21: 141-167.

Banerjee, Abhijit. and Esther Duflo (2007b), "The Economic Lives of the Middle Class," *MIMEO, MIT, 2007*

Banerjee, Abhijit, Esther Duflo and Rachel Glennerster (2006), "A Snapshot of Micro enterprises in Hyderabad," *MIMEO, MIT*.

Deaton, Angus (2004), "Measuring Poverty," in Abhijit Banerjee, Roland Benabou, and Dilip Mookherjee, eds., *Understanding Poverty*, Oxford University Press.

Frankenberg , Elizabeth, Duncan Thomas and James Smith (2001), "Lost but not forgotten: attrition and follow up in the Indonesian family life survey," *Journal of Human Resources*, 36 (3): 556-592.

Frankenberg, Elizabeth, Duncan Thomas and James Smith (2003), "Economic shocks, wealth and welfare," *Journal of Human Resources*, 38 (2): 280-321.

Frankenberg, E. and D. Thomas. "The Indonesia Family Life Survey (IFLS): Study Design and Results from Waves 1 and 2." March 2000. RAND, Santa Monica, CA. DRU-2238/1-NIA/NICHD.

Frankenberg, E. and L. Karoly. "The 1993 Indonesian Family Life Survey: Overview and Field Report." November, 1995. RAND, Santa Monica, CA.

Strauss, J., K. Beegle, B. Sikoki, A. Dwiyanto, Y. Herawati and F. Witoelar. "The Third Wave of the Indonesia Family Life Survey (IFLS): Overview and Field Report", March 2004. WR-144/1-NIA/NICHD.

Wagstaff, Adam (2002), "Poverty and Health Sector Inequalities," *Bulletin of the World Health Organization*, 80 (2).

World Bank. Living Standards Measurement Study. <http://www.worldbank.org/LSMS/>

Table 1: Old and Young in the population

	Fraction of individual aged less than 18				Fraction of individuals aged 51 or more			
	<1	<2	2 to 4	6 to 10	<1	<2	2 to 4	6 to 10
RURAL								
Bangladesh	0.51	0.49	0.42	0.38	0.13	0.13	0.16	0.21
Brazil	0.61	0.54	0.39	0.31	0.06	0.1	0.19	0.19
Ecuador	0.61	0.56	0.47	0.34	0.07	0.08	0.1	0.16
Guatemala	0.55	0.57	0.55	0.53	0.08	0.07	0.07	0.07
Indonesia00	0.4	0.41	0.37	0.3	0.13	0.13	0.13	0.14
Indonesia93	0.47	0.46	0.43	0.39	0.16	0.15	0.15	0.15
Indonesia97	0.44	0.43	0.4	0.34	0.18	0.18	0.17	0.17
Ivory coast	0.44	0.46	0.47	0.42	0.1	0.08	0.06	0.04
Mexico	0.46	0.47	0.41	0.34	0.13	0.12	0.15	0.16
Nicaragua	0.58	0.55	0.47	0.32	0.07	0.08	0.12	0.21
Pakistan*	0.44	0.43	0.4	n.a.	0.09	0.1	0.12	n.a.
Panama	0.6	0.56	0.48	0.34	0.07	0.09	0.13	0.21
Papua New	0.52	0.51	0.47	0.42	0.06	0.06	0.08	0.08
Peru	0.55	0.53	0.43	n.a.	0.09	0.1	0.16	n.a.
South Africa	0.56	0.54	0.47	0.32	0.27	0.25	0.2	0.16
Tanzania	0.55	0.54	0.47	0.46	0.11	0.1	0.1	0.15
Timor Leste	0.56	0.54	0.45	0.35	0.07	0.07	0.12	0.2
Udaipur	0.54	0.5	0.37	n.a.	0.08	0.1	0.18	n.a.
Vietnam929	0.46	0.44	0.38	0.35	0.03	0.03	0.05	0.04
Vietnam979	0.62	0.54	0.45	0.37	0.07	0.11	0.15	0.19
URBAN								
Bangladesh	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Brazil	0.63	0.54	0.44	0.33	0.06	0.11	0.13	0.17
Ecuador	0.57	0.53	0.42	0.37	0.13	0.14	0.16	0.18
Hyderabad	0.48	0.42	0.37	0.32	0.07	0.08	0.09	0.08
Indonesia00	0.34	0.36	0.32	0.25	0.18	0.13	0.13	0.15
Indonesia93	0.44	0.45	0.43	0.38	0.16	0.14	0.12	0.13
Indonesia97	0.44	0.4	0.38	0.34	0.17	0.17	0.16	0.13
Ivory coast	0.44	0.45	0.45	0.42	0.09	0.1	0.1	0.09
Mexico	0.54	0.5	0.44	0.43	0.1	0.12	0.16	0.14
Nicaragua	0.57	0.54	0.47	0.35	0.09	0.09	0.1	0.13
Pakistan*	0.46	0.44	0.38	0.4	0.09	0.09	0.1	0.14
Panama	n.a.	0.59	0.49	0.38	n.a.	0.1	0.1	0.13
Papua New	0.6	0.49	0.45	0.45	0.05	0.06	0.07	0.03
Peru	0.57	0.55	0.43	0.35	0.05	0.08	0.12	0.15
South Africa	0.11	0.11	0.11	0.11	0.15	0.2	0.2	0.18
Tanzania	0.51	0.51	0.47	0.39	0.19	0.13	0.09	0.07
Timor Leste	0.57	0.53	0.47	0.4	0.07	0.07	0.07	0.04
Udaipur	n.a.	n.a.	0.42	n.a.	n.a.	n.a.	0.22	n.a.
Vietnam929	0.48	0.4	0.35	0.28	0.03	0.03	0.06	0.09
Vietnam979	n.a.	0.45	0.41	0.3	n.a.	0.15	0.17	0.2

Table 2 A: Ratio elderly/prime age: Rural Areas

RURAL	Ratio of individuals over 51/all adults											
	All				Women				Men			
	<1	<2	2 to 4	6 to 10	<1	<2	2 to 4	6 to 10	<1	<2	2 to 4	6 to 10
Bangladesh	0.27	0.27	0.3	0.36	0.25	0.25	0.29	0.36	0.29	0.28	0.31	0.37
Brazil	0.18	0.24	0.33	0.29	0.13	0.24	0.35	0.27	0.22	0.23	0.31	0.31
Ecuador	0.19	0.19	0.2	0.26	0.17	0.19	0.21	0.26	0.2	0.18	0.19	0.25
Guatemala	0.2	0.19	0.18	0.19	0.18	0.17	0.16	0.16	0.23	0.21	0.2	0.22
Indonesia00	0.24	0.25	0.23	0.22	0.25	0.25	0.24	0.23	0.24	0.24	0.23	0.21
Indonesia93	0.33	0.29	0.28	0.27	0.32	0.29	0.28	0.28	0.33	0.29	0.27	0.25
Indonesia97	0.34	0.33	0.3	0.27	0.36	0.34	0.3	0.27	0.32	0.32	0.3	0.27
Ivory coast	0.29	0.22	0.17	0.1	0.27	0.2	0.14	0.08	0.32	0.24	0.21	0.12
Mexico	0.26	0.23	0.24	0.23	0.29	0.22	0.23	0.23	0.22	0.23	0.25	0.23
Nicaragua	0.22	0.22	0.28	0.35	0.18	0.2	0.26	0.36	0.26	0.24	0.29	0.34
Pakistan*	0.24	0.25	0.28	0.23	0.24	0.26	0.28	0.28	0.24	0.25	0.28	0.18
Panama	0.2	0.25	0.29	0.35	0.15	0.23	0.27	0.35	0.26	0.28	0.3	0.34
Papua New Guinea	0.15	0.15	0.18	0.17	0.1	0.11	0.16	0.16	0.21	0.2	0.19	0.17
Peru	0.24	0.24	0.31	n.a.	0.23	0.23	0.31	n.a.	0.25	0.25	0.32	n.a.
South Africa	0.27	0.26	0.24	0.19	0.27	0.26	0.24	0.19	0.27	0.26	0.26	0.23
Tanzania	0.29	0.26	0.23	0.3	0.26	0.23	0.2	0.34	0.32	0.29	0.27	0.24
Timor Leste	0.19	0.19	0.24	0.31	0.16	0.16	0.26	0.34	0.23	0.21	0.23	0.28
Udaipur	0.21	0.22	0.32	n.a.	0.22	0.23	0.34	n.a.	0.19	0.21	0.3	n.a.
Vietnam9293	0.13	0.13	0.2	0.17	0.13	0.11	0.18	0.22	0.13	0.15	0.23	0.11
Vietnam9798	0.2	0.25	0.29	0.34	0.25	0.27	0.32	0.34	0.14	0.21	0.27	0.34

Table 2 B: Ratio elderly/prime age: UrbanAreas

URBAN	Ratio of individuals over 51/all adults											
	All				Women				Men			
	<1	<2	2 to 4	6 to 10	<1	<2	2 to 4	6 to 10	<1	<2	2 to 4	6 to 10
Bangladesh	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Brazil	0.19	0.26	0.25	0.28	0.19	0.26	0.27	0.29	0.2	0.26	0.23	0.26
Ecuador	0.32	0.32	0.3	0.3	0.31	0.32	0.31	0.27	0.33	0.32	0.3	0.33
Hyderabad	0.16	0.16	0.16	0.14	0.15	0.16	0.15	0.15	0.18	0.17	0.16	0.13
Indonesia00	0.32	0.23	0.2	0.21	0.31	0.25	0.22	0.2	0.33	0.22	0.18	0.22
Indonesia93	0.31	0.28	0.22	0.23	0.34	0.3	0.23	0.21	0.28	0.25	0.2	0.25
Indonesia97	0.33	0.3	0.28	0.21	0.36	0.33	0.28	0.23	0.29	0.27	0.27	0.2
Ivory coast	0.25	0.27	0.27	0.19	0.21	0.24	0.23	0.15	0.33	0.33	0.31	0.23
Mexico	0.24	0.25	0.26	0.23	0.24	0.24	0.24	0.22	0.23	0.26	0.29	0.24
Nicaragua	0.24	0.23	0.22	0.23	0.26	0.23	0.22	0.26	0.22	0.23	0.21	0.2
Pakistan*	0.23	0.23	0.21	0.3	0.22	0.22	0.2	0.26	0.25	0.23	0.22	0.34
Panama	n.a.	0.27	0.23	0.23	n.a.	0.14	0.23	0.24	n.a.	0.4	0.24	0.22
Papua New Guinea	0.15	0.14	0.16	0.06	0.09	0.1	0.14	0.05	0.2	0.18	0.18	0.07
Peru	0.13	0.2	0.25	0.26	0.08	0.17	0.23	0.25	0.19	0.24	0.26	0.26
South Africa	0.26	0.23	0.22	0.18	0.26	0.23	0.22	0.18	0.32	0.25	0.23	0.18
Tanzania	0.45	0.32	0.19	0.13	0.41	0.28	0.17	0.1	0.5	0.36	0.22	0.15
Timor Leste	0.18	0.17	0.15	0.07	0.19	0.17	0.15	0.07	0.18	0.18	0.15	0.08
Udaipur	n.a.	n.a.	0.42	n.a.	n.a.	n.a.	0.44	n.a.	n.a.	n.a.	0.4	n.a.
Vietnam9293	0.11	0.1	0.2	0.21	0.11	0.08	0.17	0.2	0.11	0.12	0.22	0.21
Vietnam9798	n.a.	0.29	0.31	0.3	n.a.	0.31	0.31	0.31	n.a.	0.27	0.3	0.3

Table 3 A: out of the individuals aged 31-50

	Fraction whose father is alive				Fraction whose mother is alive			
	<\$1	<\$2	\$2-\$4	\$6-\$10	<\$1	<\$2	\$2-\$4	\$6-\$10
	ALL							
Bangladesh	0.25	0.23	0.19	n.a	0.65	0.65	0.66	n.a
Brazil	0.46	0.44	0.41	0.42	0.61	0.60	0.63	0.69
Indonesia93	0.15	0.15	0.17	0.17	0.26	0.27	0.29	0.33
Indonesia97	0.31	0.33	0.33	0.36	0.55	0.56	0.59	0.65
Indonesia00	0.30	0.36	0.34	0.35	0.50	0.62	0.63	0.61
IvoryCoast	0.22	0.26	0.29	0.38	0.44	0.48	0.54	0.55
Mexico	0.50	0.51	0.52	0.58	0.67	0.68	0.75	0.75
Nicaragua	0.57	0.54	0.51	0.56	0.68	0.71	0.75	0.74
Pakistan	0.39	0.39	0.34	n.a	0.54	0.55	0.54	n.a
SouthAfrica	0.32	0.30	0.30	0.37	0.61	0.60	0.60	0.60
Timorleste	0.09	0.17	0.23	0.30	0.29	0.29	0.33	0.51
Udaipur	0.46	0.44	0.37	n.a	0.58	0.58	0.56	n.a
Vietnam 92	0.41	0.39	0.41	n.a	0.60	0.62	0.66	n.a

Notes:

1. The data for Bangladesh, Guatemala, and Udaipur covers only rural areas
2. Cells with fewer than 100 observations are eliminated.

Table 4 A: Logit regressions

	Coefficient of ln(total expenditure per capita)	
	mother alive	Father alive
	1	2
Bangladesh	-0.004 (0.041)	-0.010 (0.053)
Brazil	0.207 (0.051)	0.152 (0.049)
Indonesia93	0.018 (0.024)	0.040 (0.028)
Indonesia97	0.097 (0.041)	0.117 (0.043)
Indonesia00	0.069 (0.040)	0.060 (0.040)
IvoryCoast	0.108 (0.083)	0.236 (0.090)
Mexico	0.127 (0.049)	0.119 (0.045)
Nicaragua	0.217 (0.070)	0.163 (0.069)
Pakistan	0.070 (0.058)	-0.090 (0.060)
SouthAfrica	0.204 (0.031)	0.308 (0.032)
Timorleste	0.176 (0.103)	0.592 (0.117)
Udaipur	0.095 (0.131)	-0.326 (0.135)

1. Regressions control for age of respondent, age squared and rural dummy

Table 4 B: Logit regression: Pooling countries

		mother alive	father alive
		(1)	(2)
PANEL A			
1. ALL			
	ln(expenditure pc)	0.12	0.10
2. RURAL		(.016)	(.016)
	ln(expenditure pc)	0.08	0.04
3. URBAN		(.024)	(.026)
	ln(expenditure pc)	0.15	0.19
		(.022)	(.023)
PANEL B			
1. ALL			
	Below 1	-0.08	-0.06
		(.053)	(.055)
	2 to 4	0.11	0.00
		(.041)	(.043)
	6 to 10	0.24	0.18
		(.057)	(.059)
2. RURAL			
	Below 1	-0.08	-0.05
		(.053)	(.054)
	2 to 4	0.11	-0.01
		(.041)	(.043)
	6 to 10	0.36	0.14
		(.098)	(.097)
3. URBAN			
	Below 1	-0.08	-0.06
		(.053)	(.054)
	2 to 4	0.11	0.00
		(.041)	(.043)
	6 to 10	0.18	0.18
		(.061)	(.063)

Notes:

1. All countries are pooled
2. Expenditure per capita expressed in 1993 PPP dollars
3. All observations are weighted using country weights, such that weights sum to 1 for each country
4. Regressions control for age of respondent, age squared, and when relevant, rural dummy
5. In panel B, only individuals living in households with dpce between 0 and 4 or between 6 and 10 are included. The excluded category is "below \$2"

Table 5: Death rate by age and category, IFLS panel

	All	Rural	Urban
A. dead by 1997, order than 50 in 1993			
less than 1 dollar a day	0.154	0.148	0.184
less than 2 dollars a day	0.158	0.155	0.170
2 to 4 dollars a day	0.135	0.126	0.155
6 to 10 dollars a day	0.073	0.029	0.117
B. dead by 2000, order than 50 in 1993			
less than 1 dollar a day	0.222	0.210	0.284
less than 2 dollars a day	0.229	0.216	0.279
2 to 4 dollars a day	0.222	0.215	0.239
6 to 10 dollars a day	0.178	0.146	0.209
C. dead by 1997, order than 45 in 1993			
less than 1 dollar a day	0.137	0.129	0.183
less than 2 dollars a day	0.141	0.136	0.164
2 to 4 dollars a day	0.119	0.114	0.131
6 to 10 dollars a day	0.069	0.030	0.106
D. dead by 2000, order than 45 in 1993			
less than 1 dollar a day	0.204	0.192	0.269
less than 2 dollars a day	0.208	0.193	0.266
2 to 4 dollars a day	0.196	0.192	0.205
6 to 10 dollars a day	0.153	0.125	0.180
E. dead by 1997, aged between 15 and 45 in 1993			
less than 1 dollar a day	0.021	0.023	0.012
less than 2 dollars a day	0.037	0.033	0.052
2 to 4 dollars a day	0.009	0.007	0.011
6 to 10 dollars a day	0.010	0.009	0.012
F. dead by 2000, aged between 15 and 45 in 1993			
less than 1 dollar a day	0.053	0.056	0.038
less than 2 dollars a day	0.060	0.053	0.082
2 to 4 dollars a day	0.013	0.012	0.015
6 to 10 dollars a day	0.014	0.011	0.017
G. dead by 1997, aged between 5 and 15 in 1993			
less than 1 dollar a day	0.014	0.017	0.018
less than 2 dollars a day	0.030	0.029	0.037
2 to 4 dollars a day	0.003	0.004	0.002
6 to 10 dollars a day	0.011	0.010	0.011
H. dead by 2000, aged between 5 and 15 in 1993			
less than 1 dollar a day	0.044	0.046	0.034
less than 2 dollars a day	0.050	0.045	0.067
2 to 4 dollars a day	0.009	0.011	0.006
6 to 10 dollars a day	0.013	0.010	0.016
I. dead by 1997, aged less than 5 in 1993			
less than 1 dollar a day	0.027	0.031	0.000
less than 2 dollars a day	0.038	0.040	0.032
2 to 4 dollars a day	0.008	0.005	0.011
6 to 10 dollars a day	0.010	0.018	0.000
J. dead by 2000, aged less than 5 in in 1993			
less than 1 dollar a day	0.046	0.048	0.030
less than 2 dollars a day	0.055	0.054	0.057
2 to 4 dollars a day	0.013	0.011	0.018
6 to 10 dollars a day	0.012	0.018	0.006

Note:

1. Data is from the IFLS panel
2. Each cell is the fraction of people found in 1993 who have died by the indicated year

Table 6: Death Rates by age and consumption category
VLSSS Panel

	All	Rural	Urban
A. Dead by 1997, order than 50 in 1993			
less than 1 dollar a day	0.145	0.149	
less than 2 dollars a day	0.131	0.131	0.132
2 to 4 dollars a day	0.111	0.115	0.100
6 to 10 dollars a day	0.098	0.053	0.108
B. Dead by 1997, order than 45 in 1993			
less than 1 dollar a day	0.120	0.124	
less than 2 dollars a day	0.112	0.112	0.110
2 to 4 dollars a day	0.096	0.098	0.090
6 to 10 dollars a day	0.080	0.040	0.090
C. Dead by 1997, aged between 15 and 45 in 1993			
less than 1 dollar a day	0.010	0.010	
less than 2 dollars a day	0.010	0.010	0.007
2 to 4 dollars a day	0.008	0.006	0.014
6 to 10 dollars a day	0.000	0.000	0.000
D. Dead by 1997, aged between 5 and 15 in 1993			
less than 1 dollar a day	0.007	0.008	
less than 2 dollars a day	0.006	0.006	0.000
2 to 4 dollars a day	0.004	0.003	0.005
6 to 10 dollars a day	0.000	0.000	0.000
E. Dead by 1997, aged less than 5 in 1993			
less than 1 dollar a day	0.015	0.012 n.a.	
less than 2 dollars a day	0.012	0.012	0.014
2 to 4 dollars a day	0.007	0.005	0.011
6 to 10 dollars a day	0.000	0.000	0.000

Note:

1. Data is from the Vietnam Living Standard Survey
2. Each cell is the fraction of people found in 1992 who have died by 1997

table 7: Udaipur

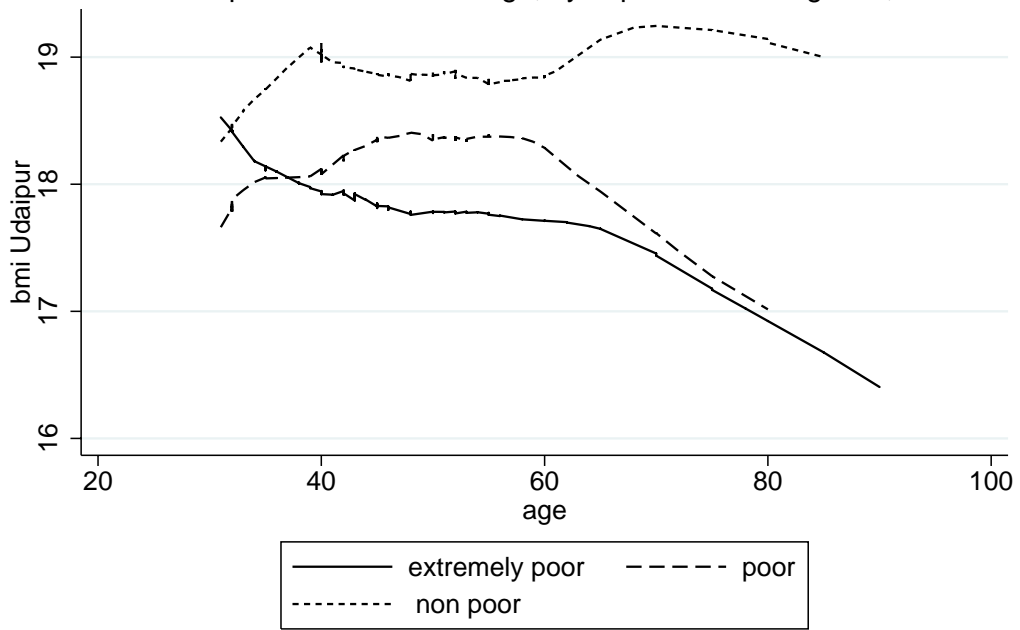
	Mortality one year out	Mortality two years out
A. Aged 50 or more at baseline		
less than 1 dollar a day	0.053	0.0659
less than 2 dollars a day	0.0462	0.0489
more than 2 dollars a day	0.0349	0.0535
B. Aged 46 or more at baseline		
less than 1 dollar a day	0.0488	0.0521
less than 2 dollars a day	0.0406	0.0405
more than 2 dollars a day	0.0321	0.045
C. Aged 16 to 45 at baseline		
less than 1 dollar a day	0.0099	0.0098
less than 2 dollars a day	0.0058	0.0057
more than 2 dollars a day	0	0.0184
D. Aged 6 to 15 at baseline		
less than 1 dollar a day	0.0014	0.0066
less than 2 dollars a day	0.0046	0.0087
more than 2 dollars a day	0.0159	0
E. Aged less than 5 at baseline		
less than 1 dollar a day	0.0354	0.0273
less than 2 dollars a day	0.0228	0.0279
more than 2 dollars a day	0	0

Note

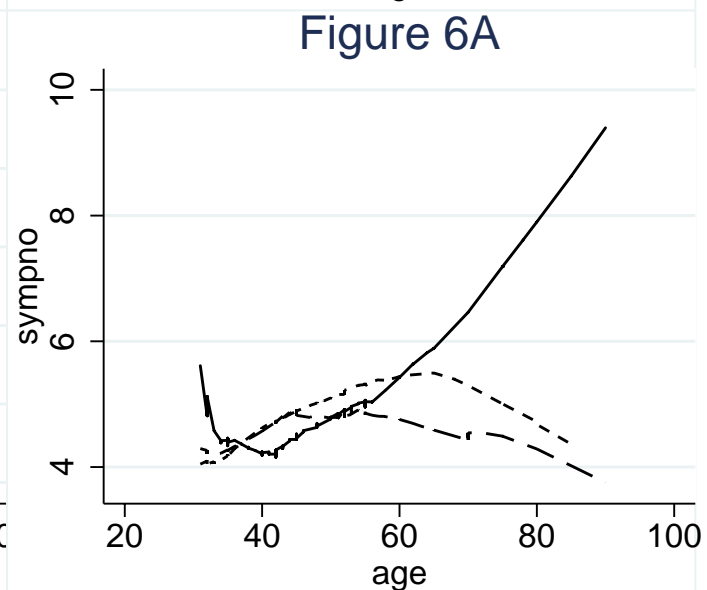
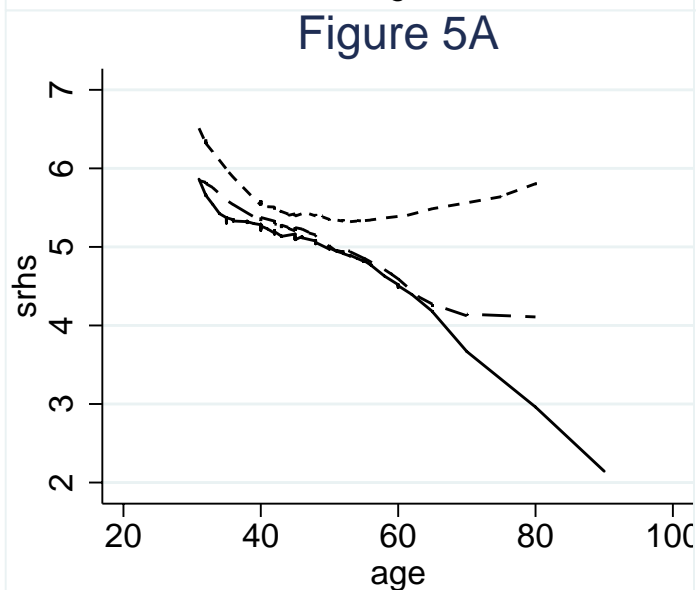
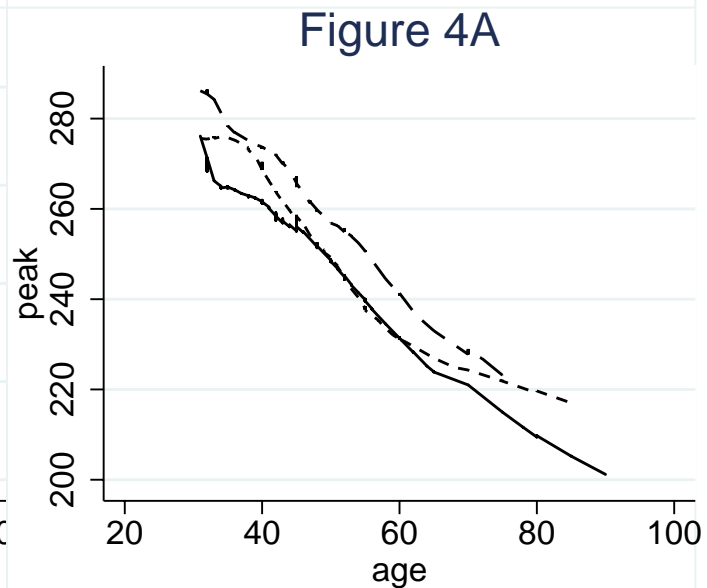
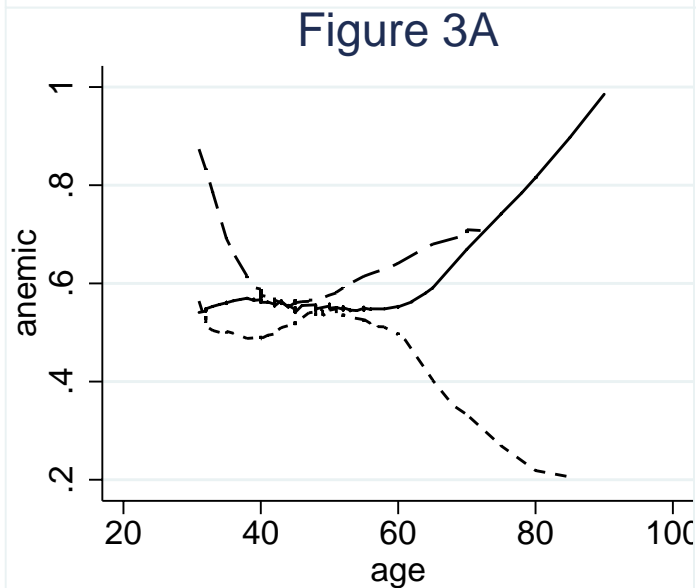
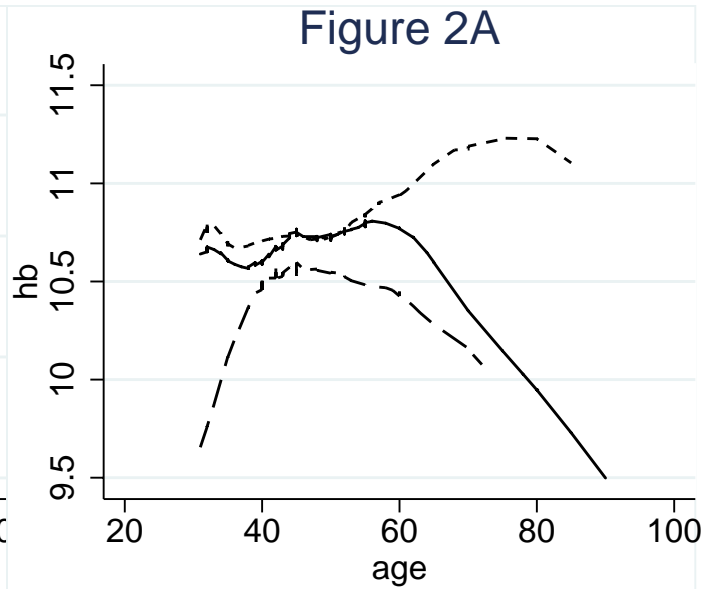
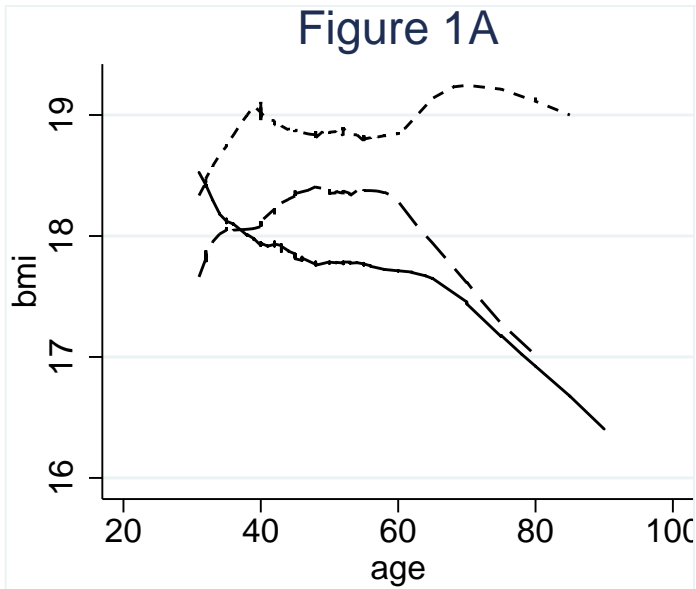
1. data is from the Udaipur survey

Figure 1A -- Udaipur

Relationship between bmi and age, by expenditure categories, females



Health indicators and age, females, Udaipur



health indicator and age, females, Udaipur

Figure 7A

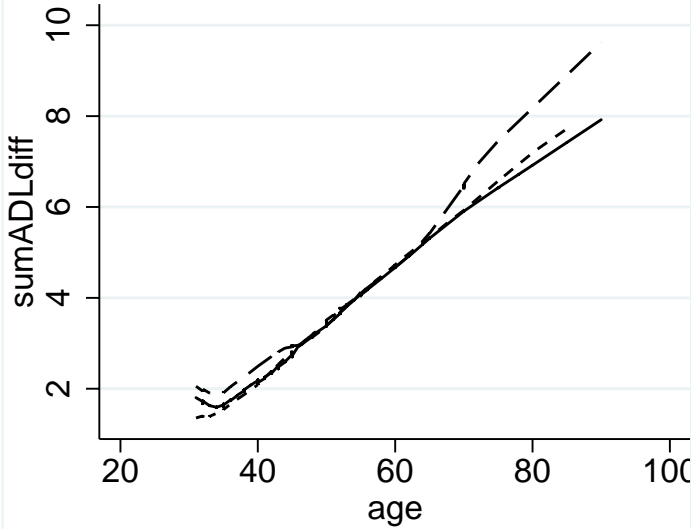


Figure 8A

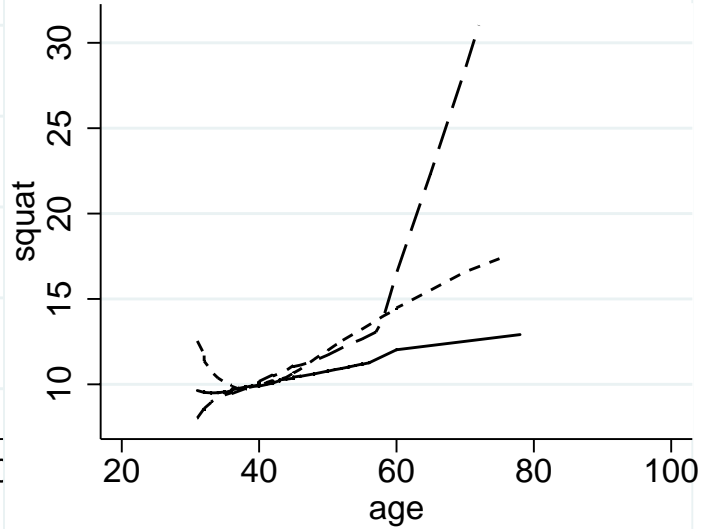


Figure 9A

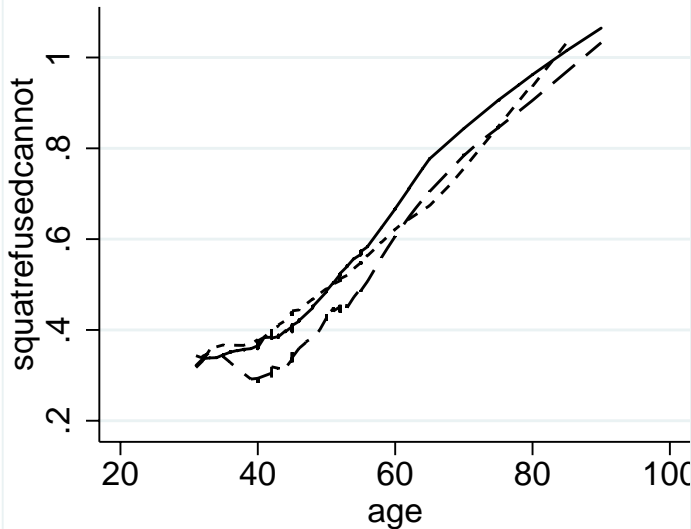


Figure 10A

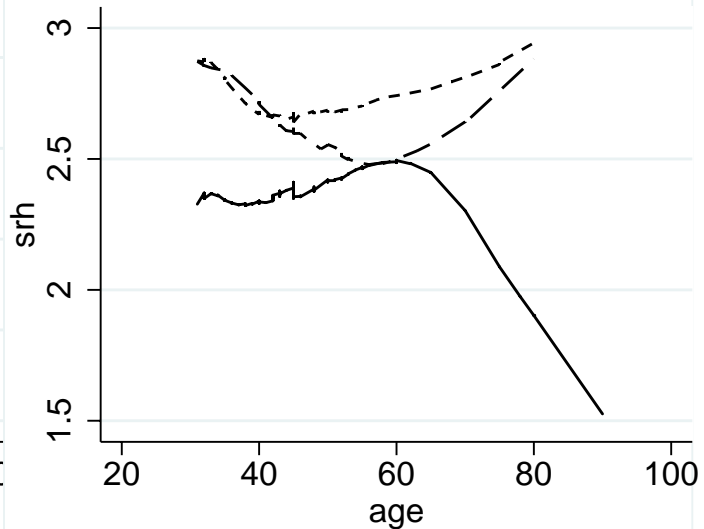


Figure 11A

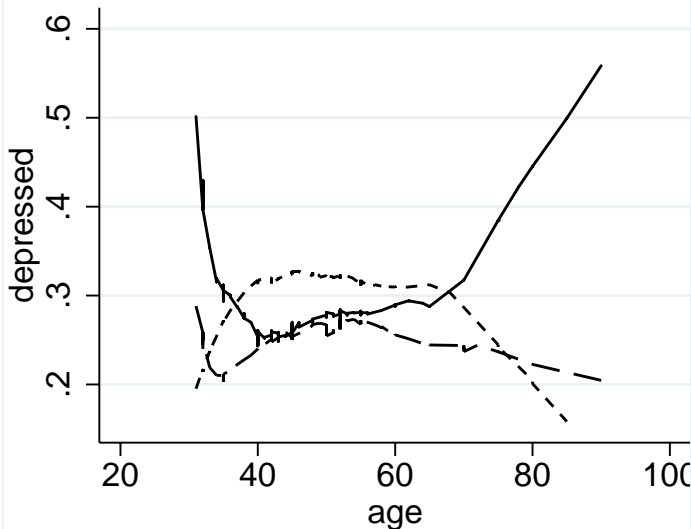
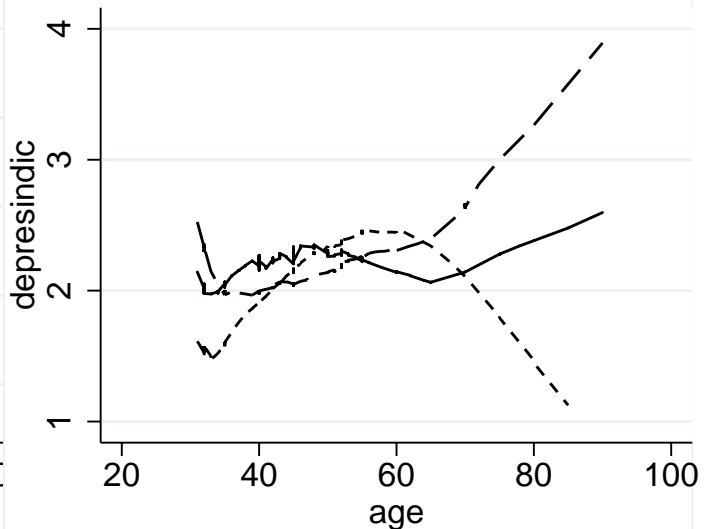


Figure 12A



Health indicators and age, males, Udaipur

Figure 1B

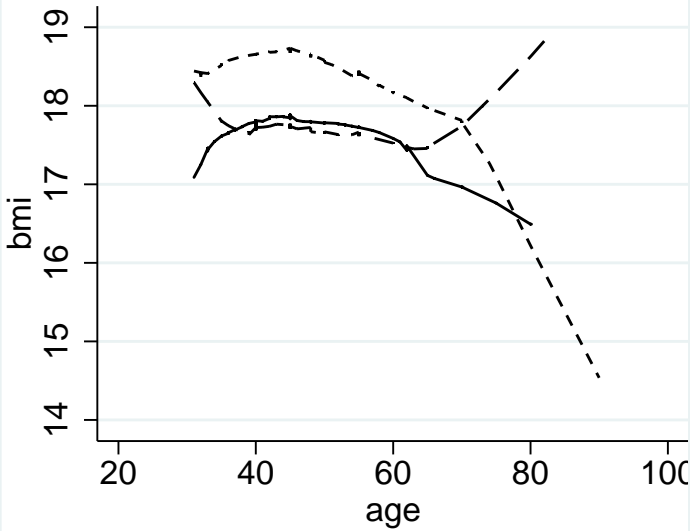


Figure 2B

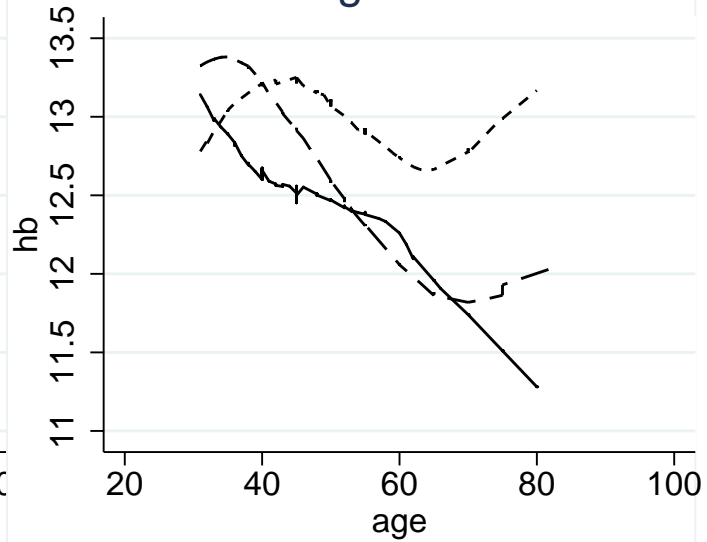


Figure 3B

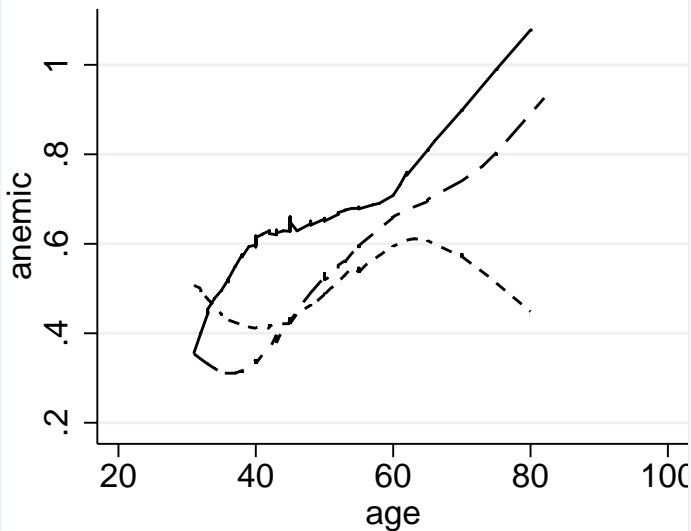


Figure 4B

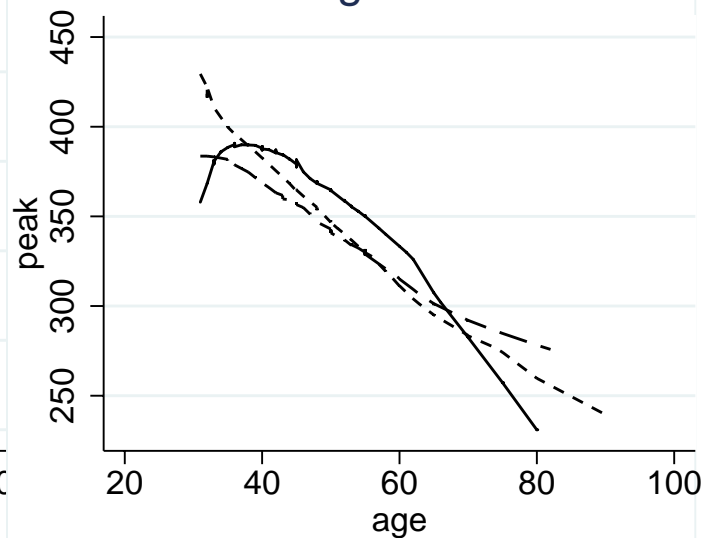


Figure 5B

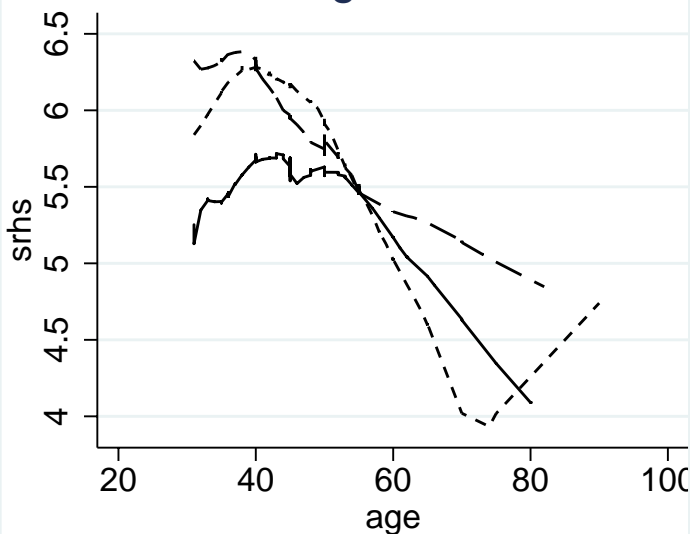
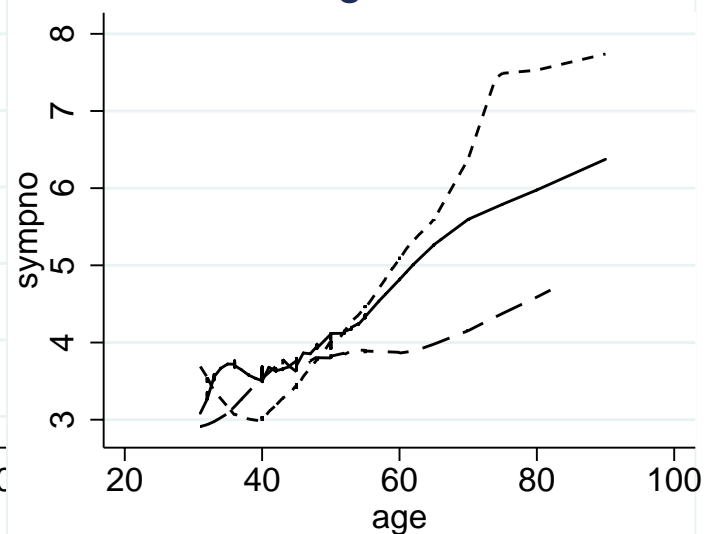


Figure 6B



health indicator and age, males, Udaipur

Figure 7B

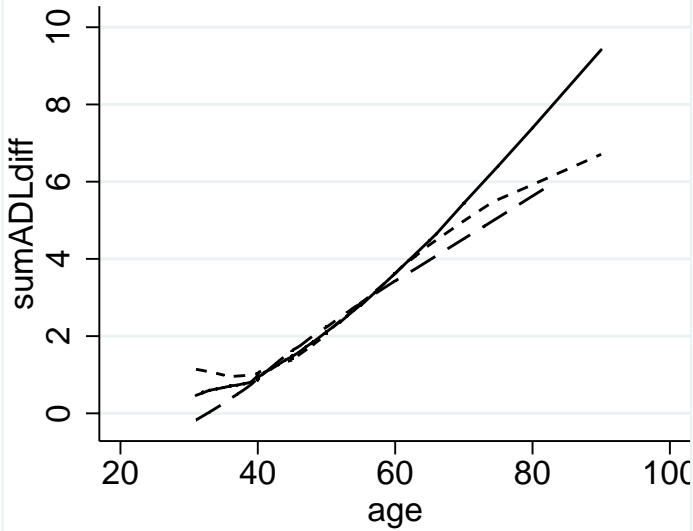


Figure 8B

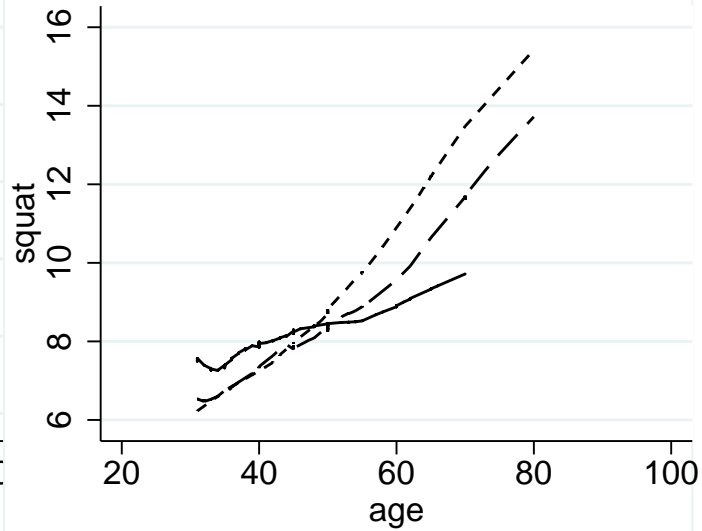


Figure 9B

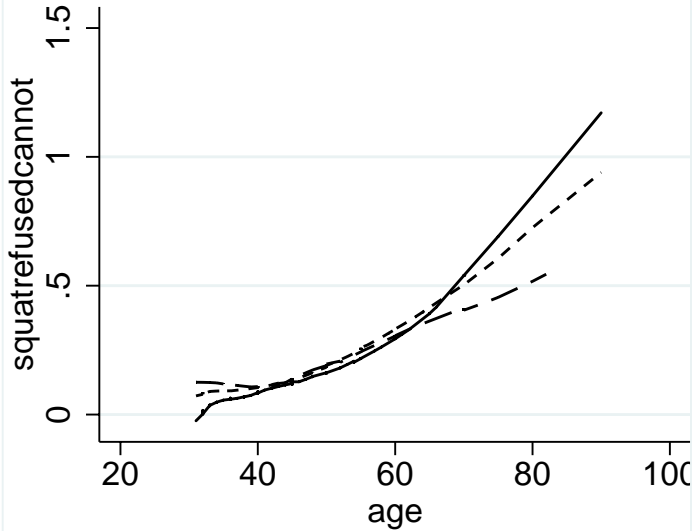


Figure 10B

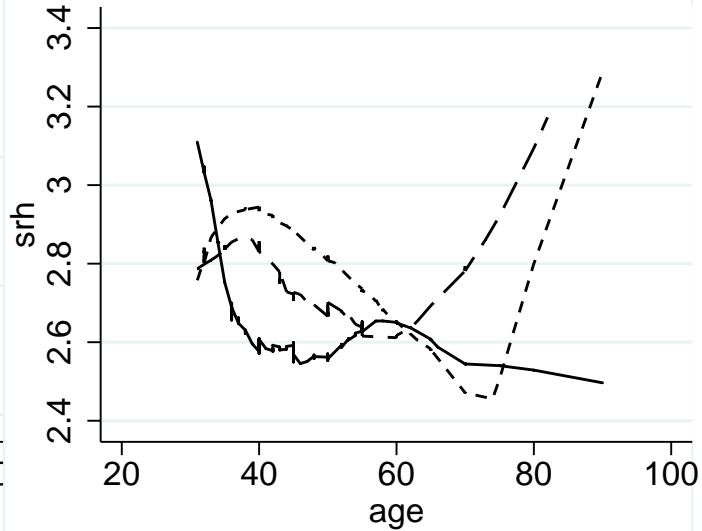


Figure 11B

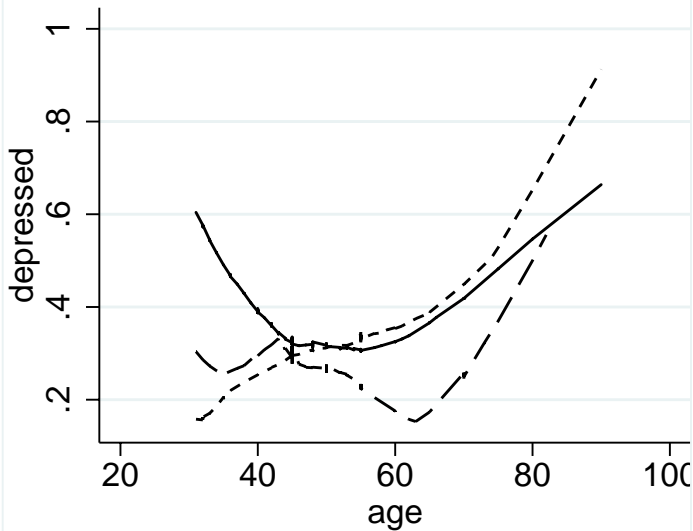


Figure 12B

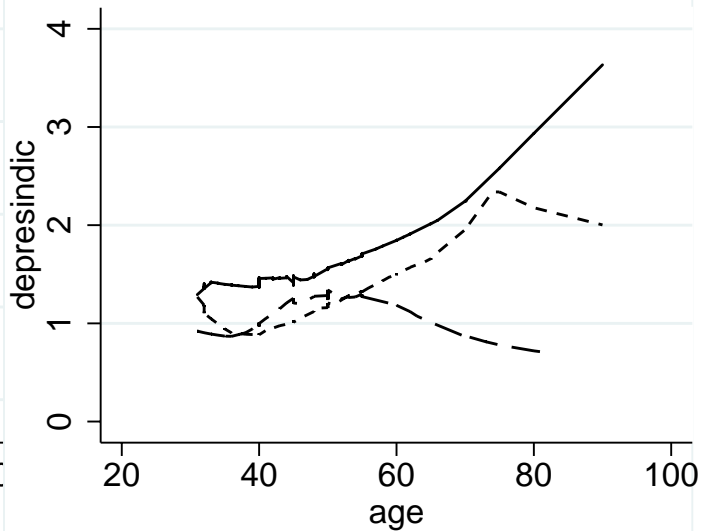
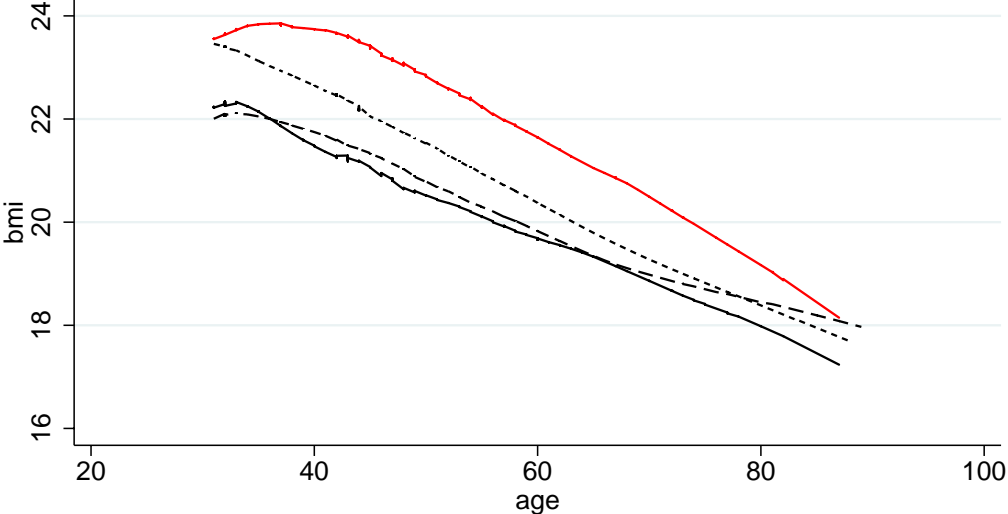
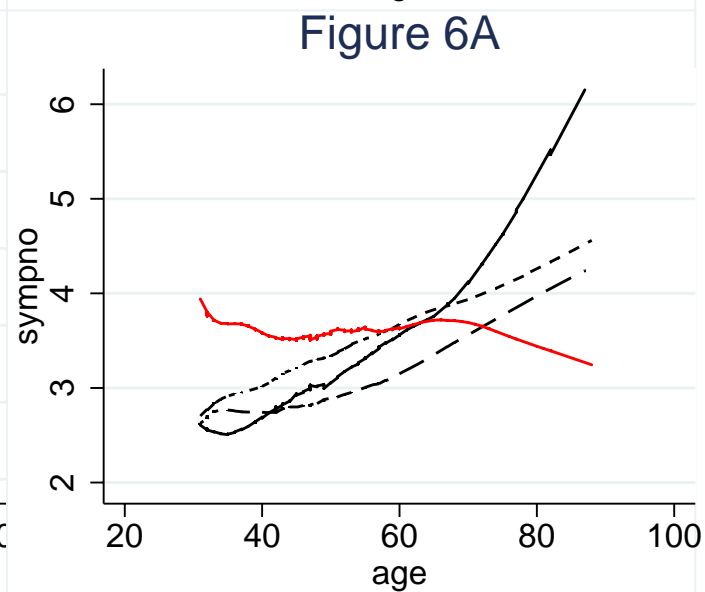
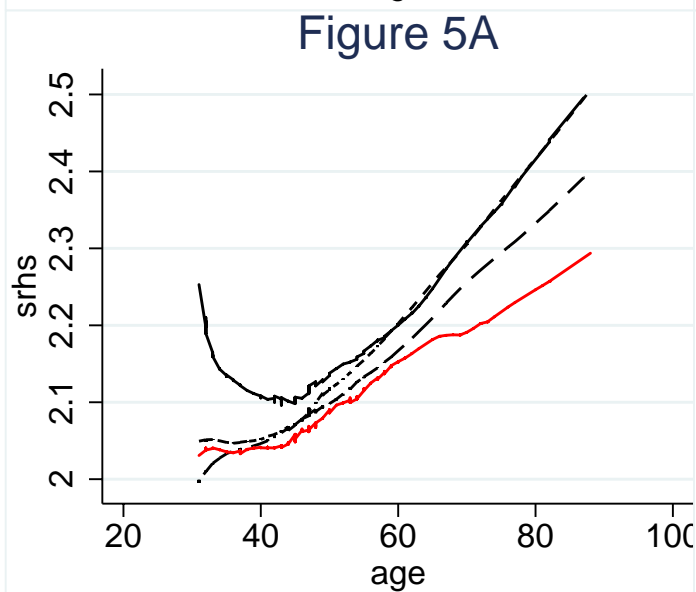
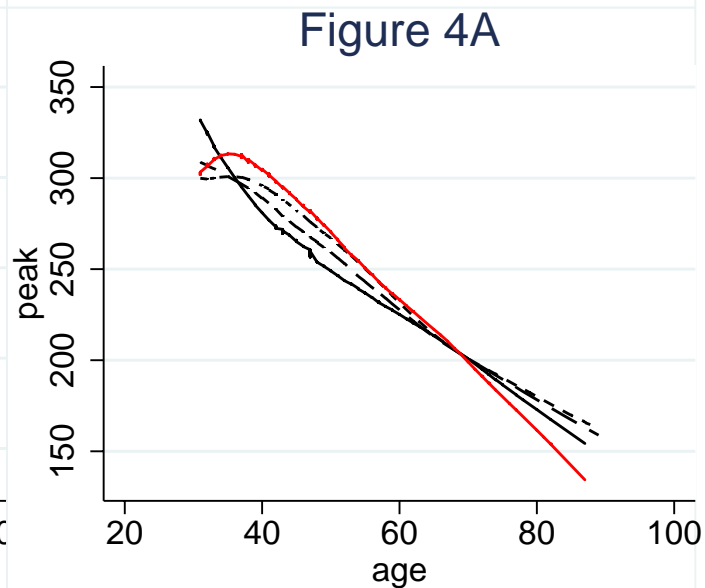
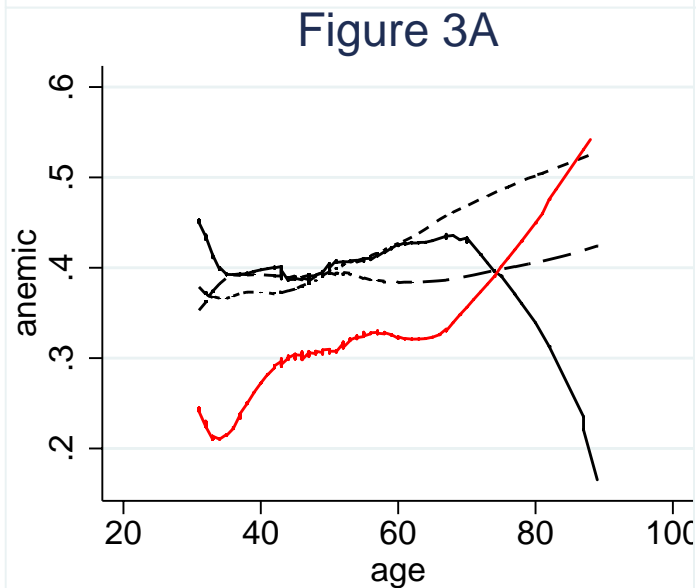
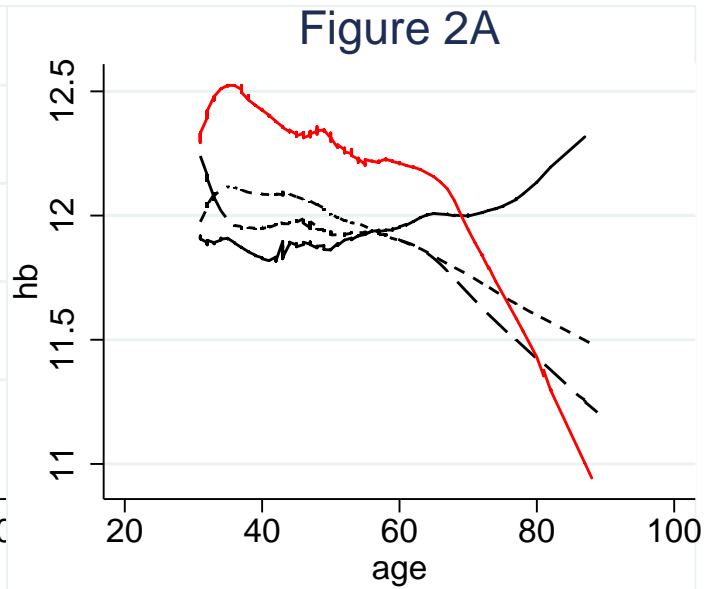
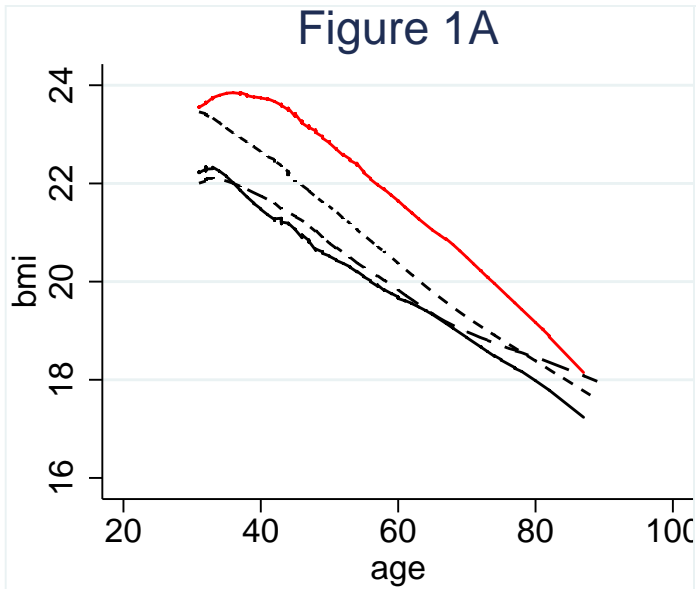


Figure 1A -- Rural Indonesia

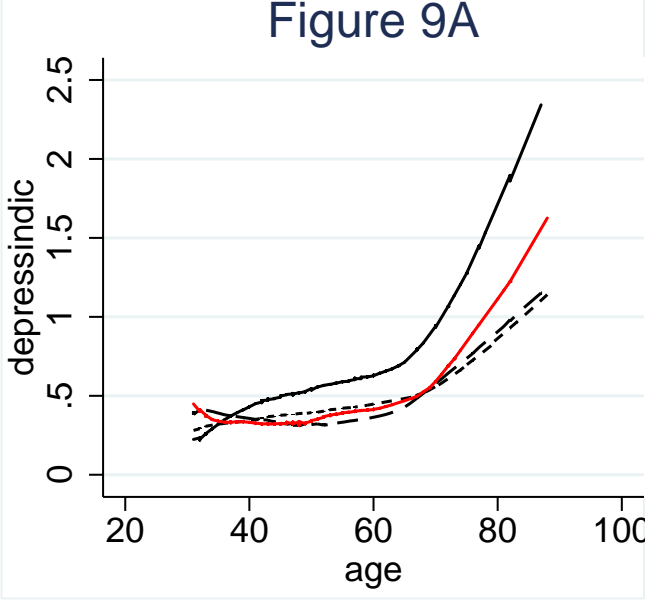
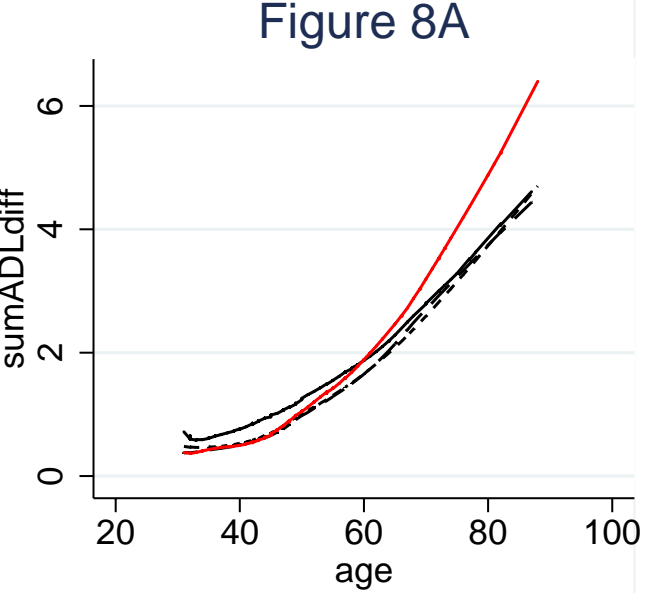
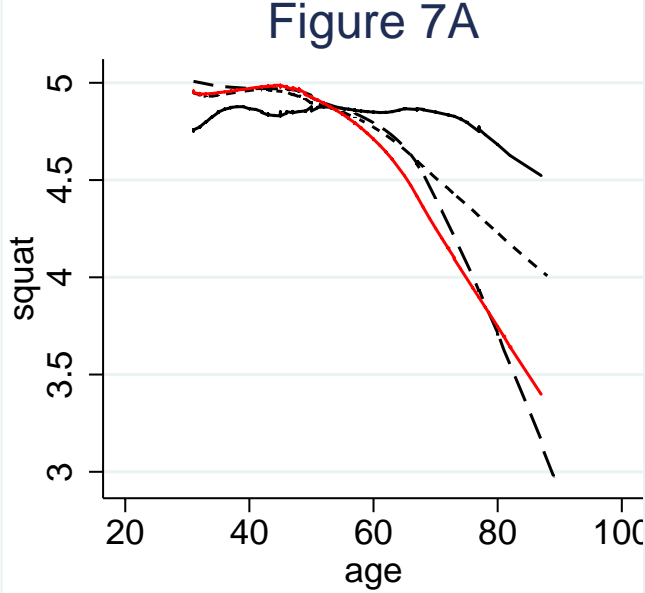
Relationship between bmi and age, by expenditure categories, females



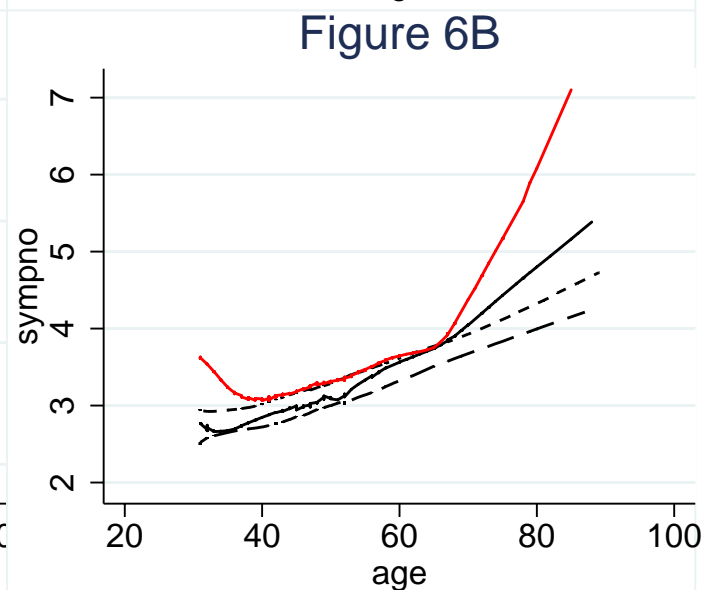
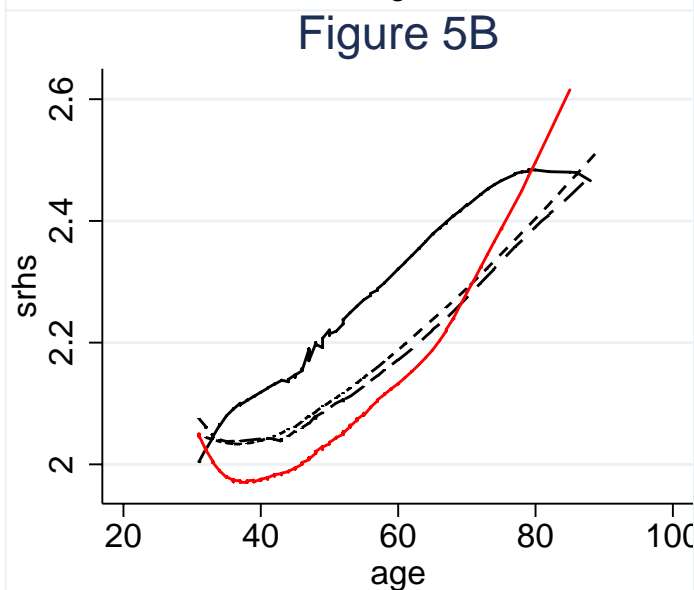
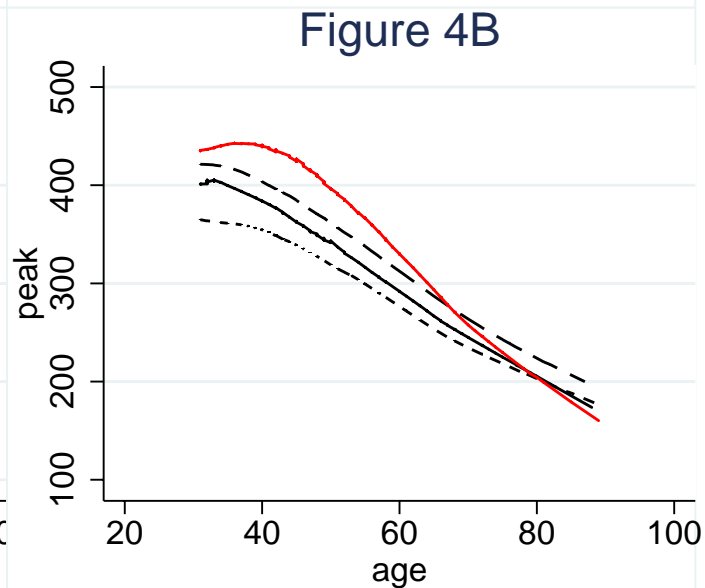
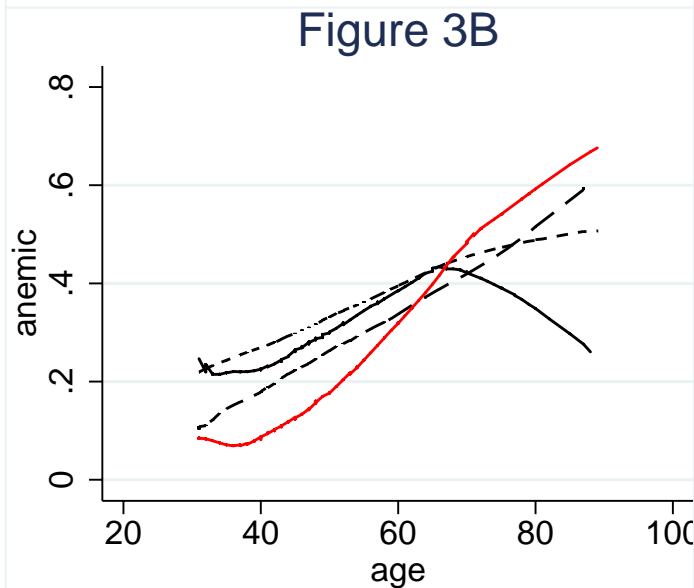
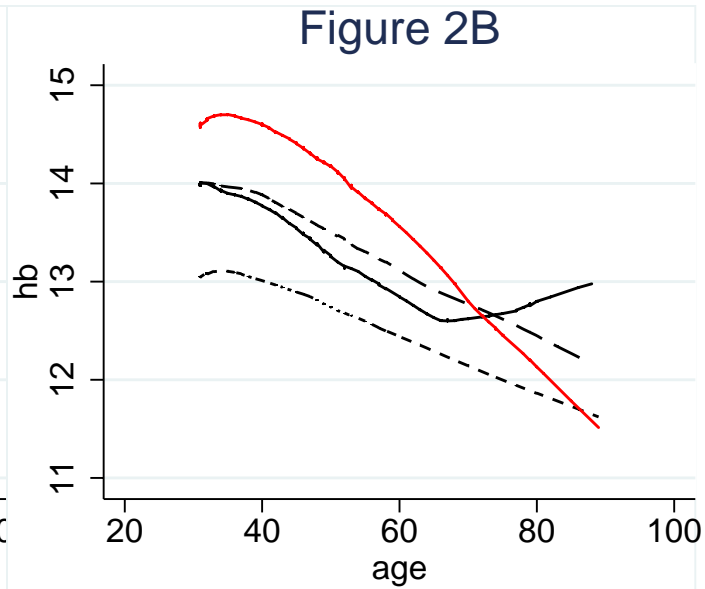
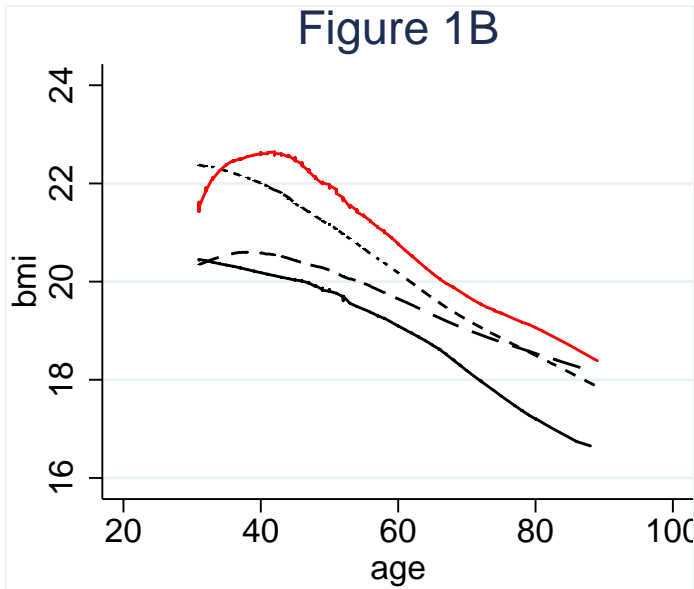
Health indicators and age, females, Rural Indone



health indicator and age, females, Rural Indonesia



Health indicators and age, males, Rural Indones



health indicator and age, males, Rural Indonesia

Figure 7B

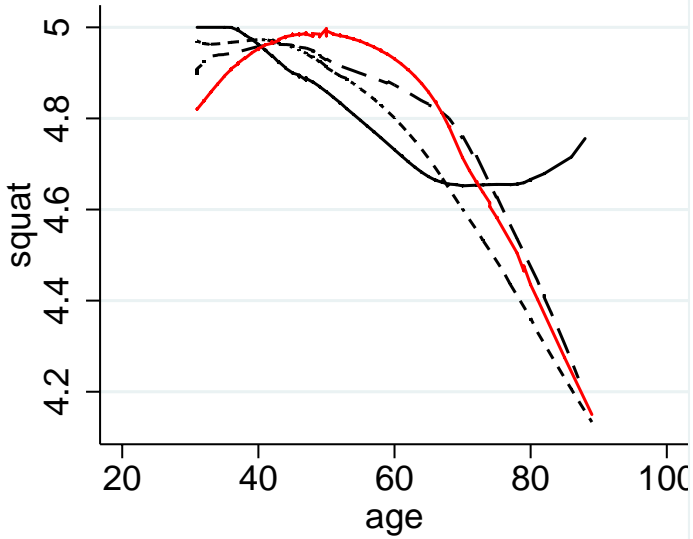


Figure 8B

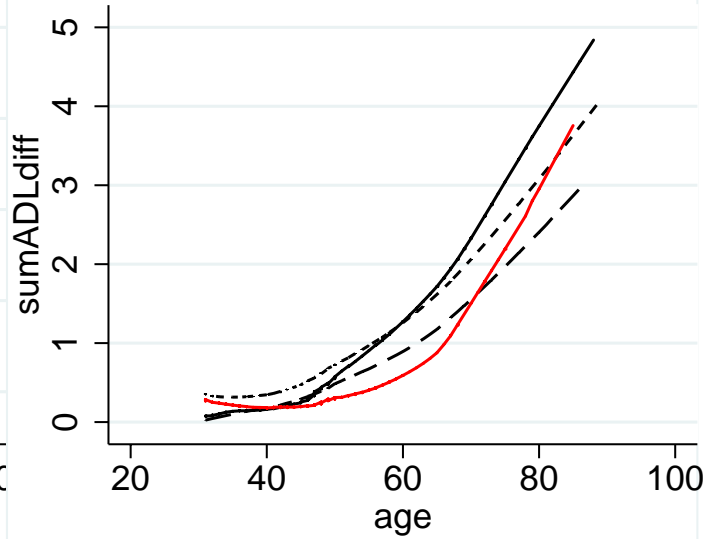


Figure 9B

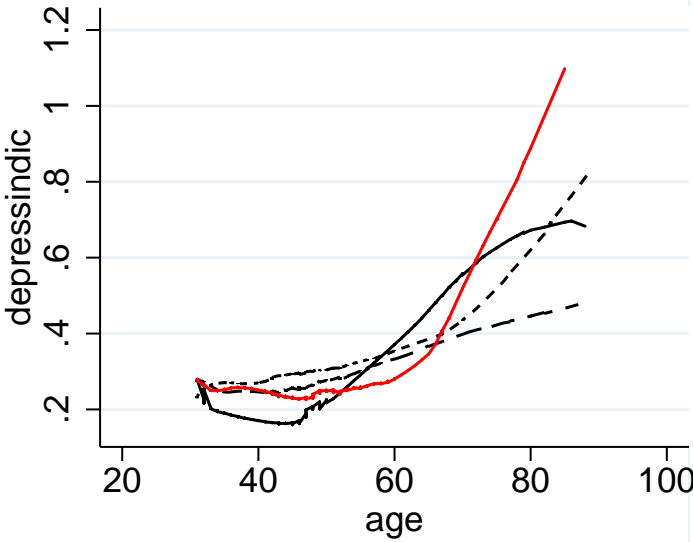


Table A1: Share of women in different age group in the population, by consumption category

	girls aged 0 to 12				girls aged 13-18				women aged 20-50				women aged 51 and above			
	<1	<2	2 to 4	6 to 10	<1	<2	2 to 4	6 to 10	<1	<2	2 to 4	6 to 10	<1	<2	2 to 4	6 to 10
RURAL																
Bangladesh	0.19	0.18	0.14	0.1	0.06	0.06	0.06	0.08	0.18	0.19	0.2	0.17	0.06	0.06	0.08	0.09
Brazil	0.22	0.18	0.13	0.09	0.07	0.07	0.06	0.08	0.15	0.16	0.19	0.24	0.02	0.05	0.1	0.09
Ecuador	0.14	0.19	0.16	0.11	0.03	0.07	0.07	0.06	0.16	0.17	0.21	0.25	0.03	0.04	0.05	0.09
Guatemala	0.22	0.23	0.21	0.19	0.07	0.06	0.07	0.09	0.16	0.16	0.17	0.19	0.03	0.03	0.03	0.04
Hyderabad	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Indonesia00	0.13	0.13	0.12	0.08	0.08	0.07	0.07	0.08	0.19	0.2	0.2	0.23	0.06	0.07	0.06	0.07
Indonesia93	0.17	0.17	0.15	0.11	0.06	0.06	0.07	0.06	0.18	0.19	0.21	0.23	0.09	0.08	0.08	0.09
Indonesia97	0.16	0.14	0.12	0.12	0.07	0.07	0.08	0.06	0.18	0.19	0.2	0.23	0.1	0.1	0.09	0.09
Ivory coast	0.1	0.09	0.1	0.08	0.06	0.08	0.09	0.11	0.16	0.16	0.16	0.17	0.06	0.04	0.03	0.01
Mexico	0.15	0.17	0.13	0.12	0.08	0.06	0.08	0.05	0.17	0.21	0.24	0.3	0.07	0.06	0.07	0.09
Nicaragua	0.2	0.19	0.16	0.1	0.07	0.07	0.07	0.08	0.14	0.14	0.16	0.19	0.03	0.04	0.06	0.1
Pakistan*	0.09	0.09	0.08	na	0.06	0.06	0.08	na	0.13	0.14	0.15	na	0.04	0.05	0.06	na
Panama	0.2	0.2	0.16	0.11	0.08	0.06	0.06	0.05	0.15	0.14	0.15	0.19	0.03	0.04	0.06	0.1
Papua New Guin	0.2	0.18	0.14	0.12	0.08	0.07	0.07	0.06	0.18	0.18	0.19	0.2	0.02	0.02	0.04	0.04
Peru	0.23	0.21	0.14	n.a.	0.06	0.07	0.06	n.a.	0.15	0.15	0.18	n.a.	0.04	0.05	0.08	n.a.
South Africa	0.04	0.04	0.03	0.03	0.02	0.02	0.02	0.01	0.18	0.19	0.23	0.25	0.08	0.08	0.09	0.08
Tanzania	0.2	0.2	0.17	0.2	0.07	0.07	0.08	0.07	0.15	0.16	0.18	0.19	0.05	0.05	0.04	0.1
Timor Leste	0.22	0.2	0.17	0.23	0.06	0.06	0.04	0	0.16	0.17	0.18	0.24	0.03	0.03	0.06	0.12
Udaipur	0.21	0.19	0.12	n.a.	0.06	0.06	0.08	n.a.	0.15	0.16	0.17	n.a.	0.04	0.05	0.09	n.a.
Vietnam9293	0.19	0.17	0.13	0.12	0.04	0.05	0.06	0.04	0.08	0.1	0.09	0.09	0.01	0.01	0.02	0.02
Vietnam9798	0.26	0.2	0.14	0.08	0.08	0.08	0.08	0.09	0.14	0.17	0.19	0.19	0.05	0.06	0.09	0.1
URBAN																
Bangladesh	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Brazil	0.27	0.19	0.15	0.11	0.07	0.07	0.07	0.06	0.16	0.17	0.19	0.23	0.04	0.06	0.07	0.1
Ecuador	0.2	0.18	0.14	0.11	0.06	0.07	0.07	0.07	0.14	0.15	0.18	0.21	0.06	0.07	0.08	0.08
Hyderabad	0.17	0.14	0.1	0.09	0.07	0.07	0.07	0.07	0.19	0.21	0.23	0.21	0.03	0.04	0.04	0.04
Indonesia00	0.11	0.12	0.1	0.07	0.05	0.06	0.06	0.05	0.18	0.21	0.24	0.27	0.08	0.07	0.07	0.07
Indonesia93	0.15	0.15	0.14	0.1	0.06	0.07	0.07	0.1	0.19	0.19	0.21	0.23	0.1	0.08	0.07	0.06
Indonesia97	0.1	0.12	0.11	0.09	0.08	0.08	0.07	0.08	0.18	0.19	0.22	0.24	0.1	0.1	0.09	0.07
Ivory coast	0.09	0.09	0.1	0.08	0.06	0.06	0.07	0.06	0.17	0.17	0.16	0.21	0.05	0.05	0.05	0.04
Mexico	0.19	0.18	0.14	0.14	0.09	0.08	0.07	0.08	0.17	0.19	0.24	0.27	0.05	0.06	0.07	0.08
Nicaragua	0.21	0.2	0.15	0.1	0.07	0.07	0.08	0.07	0.15	0.16	0.19	0.24	0.05	0.05	0.06	0.08
Pakistan*	0.11	0.1	0.07	0.07	0.07	0.07	0.08	0.08	0.14	0.14	0.17	0.16	0.04	0.04	0.04	0.06
Panama	n.a.	0.23	0.18	0.13	n.a.	0.06	0.07	0.06	n.a.	0.17	0.17	0.22	n.a.	0.03	0.05	0.07
Papua New Guin	0.22	0.2	0.15	0.16	0.11	0.07	0.07	0.04	0.14	0.17	0.21	0.18	0.01	0.02	0.03	0.01
Peru	0.21	0.18	0.14	0.1	0.08	0.08	0.08	0.08	0.17	0.17	0.21	0.24	0.01	0.04	0.06	0.08
South Africa	0.03	0.03	0.03	0.03	0.01	0.02	0.02	0.02	0.19	0.2	0.23	0.25	0.09	0.07	0.07	0.06
Tanzania	0.17	0.18	0.16	0.14	0.08	0.07	0.08	0.07	0.14	0.16	0.19	0.22	0.1	0.06	0.04	0.03
Timor Leste	0.17	0.18	0.16	0.14	0.06	0.08	0.07	0.05	0.16	0.16	0.18	0.22	0.04	0.03	0.03	0.02
Udaipur	n.a.	n.a.	0.11	n.a.	n.a.	n.a.	0.11	n.a.	n.a.	n.a.	0.14	n.a.	n.a.	n.a.	0.11	n.a.
Vietnam9293	0.14	0.15	0.12	0.09	0.05	0.06	0.06	0.04	0.1	0.11	0.13	0.19	0.01	0.01	0.03	0.05
Vietnam9798	n.a.	0.14	0.13	0.08	n.a.	0.05	0.08	0.07	n.a.	0.18	0.21	0.25	n.a.	0.08	0.1	0.11

Table A2: Share of men in different age group in the population, by consumption category

	boys aged 0 to 12				boys aged 13-18				men aged 20-50				men aged 51 and above			
	<1	<2	2 to 4	6 to 10	<1	<2	2 to 4	6 to 10	<1	<2	2 to 4	6 to 10	<1	<2	2 to 4	6 to 10
RURAL																
Bangladesh	0.18	0.17	0.15	0.07	0.07	0.08	0.08	0.13	0.16	0.16	0.18	0.21	0.06	0.06	0.08	0.12
Brazil	0.23	0.2	0.13	0.1	0.09	0.08	0.07	0.05	0.14	0.16	0.2	0.23	0.04	0.05	0.09	0.11
Ecuador	0.34	0.22	0.17	0.12	0.1	0.07	0.07	0.06	0.14	0.16	0.19	0.22	0.04	0.04	0.05	0.07
Guatemala	0.21	0.22	0.21	0.2	0.05	0.06	0.06	0.06	0.14	0.14	0.14	0.13	0.04	0.04	0.04	0.04
Hyderabad	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Indonesia00	0.13	0.14	0.12	0.09	0.06	0.06	0.06	0.05	0.2	0.2	0.23	0.27	0.06	0.06	0.07	0.07
Indonesia93	0.18	0.17	0.15	0.13	0.06	0.06	0.07	0.09	0.16	0.17	0.18	0.19	0.08	0.07	0.07	0.07
Indonesia97	0.16	0.15	0.12	0.09	0.06	0.07	0.08	0.06	0.16	0.17	0.19	0.22	0.08	0.08	0.08	0.08
Ivory coast	0.21	0.21	0.19	0.15	0.07	0.08	0.09	0.08	0.09	0.11	0.14	0.18	0.04	0.04	0.04	0.03
Mexico	0.14	0.16	0.14	0.11	0.09	0.08	0.06	0.05	0.19	0.19	0.22	0.25	0.05	0.06	0.07	0.07
Nicaragua	0.21	0.2	0.16	0.07	0.1	0.09	0.08	0.07	0.12	0.14	0.16	0.2	0.04	0.05	0.07	0.1
Pakistan*	0.22	0.21	0.17	0.14	0.07	0.07	0.07	0.06	0.14	0.15	0.17	0.19	0.05	0.05	0.07	0.04
Panama	0.23	0.22	0.18	0.12	0.09	0.08	0.08	0.06	0.12	0.14	0.17	0.21	0.04	0.05	0.07	0.11
Papua New Guin	0.17	0.19	0.19	0.16	0.07	0.07	0.08	0.09	0.15	0.16	0.18	0.21	0.04	0.04	0.04	0.04
Peru	0.21	0.2	0.15	n.a.	0.05	0.06	0.07	n.a.	0.14	0.15	0.17	n.a.	0.05	0.05	0.08	n.a.
South Africa	0.04	0.04	0.04	0.03	0.01	0.02	0.02	0.02	0.14	0.15	0.2	0.37	0.06	0.06	0.06	0.07
Tanzania	0.21	0.21	0.16	0.09	0.07	0.07	0.07	0.09	0.12	0.13	0.16	0.16	0.05	0.05	0.06	0.05
Timor Leste	0.21	0.22	0.18	0.06	0.06	0.06	0.06	0.06	0.14	0.15	0.18	0.21	0.04	0.04	0.05	0.08
Udaipur	0.22	0.2	0.12	n.a.	0.05	0.06	0.06	n.a.	0.16	0.17	0.2	n.a.	0.04	0.05	0.09	n.a.
Vietnam9293	0.18	0.18	0.13	0.18	0.04	0.05	0.06	0.01	0.08	0.1	0.09	0.1	0.01	0.02	0.03	0.01
Vietnam9798	0.2	0.2	0.15	0.11	0.08	0.07	0.08	0.09	0.15	0.16	0.17	0.18	0.02	0.04	0.06	0.09
URBAN																
Bangladesh	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Brazil	0.27	0.19	0.15	0.11	0.07	0.07	0.07	0.06	0.16	0.17	0.19	0.23	0.04	0.06	0.07	0.1
Ecuador	0.2	0.18	0.14	0.11	0.06	0.07	0.07	0.07	0.14	0.15	0.18	0.21	0.06	0.07	0.08	0.08
Hyderabad	0.17	0.14	0.1	0.09	0.07	0.07	0.07	0.07	0.19	0.21	0.23	0.21	0.03	0.04	0.04	0.04
Indonesia00	0.11	0.12	0.1	0.07	0.05	0.06	0.06	0.05	0.18	0.21	0.24	0.27	0.08	0.07	0.07	0.07
Indonesia93	0.15	0.15	0.14	0.1	0.06	0.07	0.07	0.1	0.19	0.19	0.21	0.23	0.1	0.08	0.07	0.06
Indonesia97	0.1	0.12	0.11	0.09	0.08	0.08	0.07	0.08	0.18	0.19	0.22	0.24	0.1	0.1	0.09	0.07
Ivory coast	0.09	0.09	0.1	0.08	0.06	0.06	0.07	0.06	0.17	0.17	0.16	0.21	0.05	0.05	0.05	0.04
Mexico	0.19	0.18	0.14	0.14	0.09	0.08	0.07	0.08	0.17	0.19	0.24	0.27	0.05	0.06	0.07	0.08
Nicaragua	0.21	0.2	0.15	0.1	0.07	0.07	0.08	0.07	0.15	0.16	0.19	0.24	0.05	0.05	0.06	0.08
Pakistan*	0.11	0.1	0.07	0.07	0.07	0.07	0.08	0.08	0.14	0.14	0.17	0.16	0.04	0.04	0.04	0.06
Panama	n.a.	0.23	0.18	0.13	n.a.	0.06	0.07	0.06	n.a.	0.17	0.17	0.22	n.a.	0.03	0.05	0.07
Papua New Guin	0.22	0.2	0.15	0.16	0.11	0.07	0.07	0.04	0.14	0.17	0.21	0.18	0.01	0.02	0.03	0.01
Peru	0.21	0.18	0.14	0.1	0.08	0.08	0.08	0.08	0.17	0.17	0.21	0.24	0.01	0.04	0.06	0.08
South Africa	0.03	0.03	0.03	0.03	0.01	0.02	0.02	0.02	0.19	0.2	0.23	0.25	0.09	0.07	0.07	0.06
Tanzania	0.17	0.18	0.16	0.14	0.08	0.07	0.08	0.07	0.14	0.16	0.19	0.22	0.1	0.06	0.04	0.03
Timor Leste	0.17	0.18	0.16	0.14	0.06	0.08	0.07	0.05	0.16	0.16	0.18	0.22	0.04	0.03	0.03	0.02
Udaipur	n.a.	n.a.	0.11	n.a.	n.a.	n.a.	0.11	n.a.	n.a.	n.a.	0.14	n.a.	n.a.	n.a.	0.11	n.a.
Vietnam9293	0.14	0.15	0.12	0.09	0.05	0.06	0.06	0.04	0.1	0.11	0.13	0.19	0.01	0.01	0.03	0.05
Vietnam9798	n.a.	0.14	0.13	0.08	n.a.	0.05	0.08	0.07	n.a.	0.18	0.21	0.25	n.a.	0.08	0.1	0.11

Table A3: out of the individuals aged 31-50 whose mother is alive

	Fraction whose father lives in household				Fraction whose mother lives in household			
	<\$1	<\$2	\$2-\$4	\$6-\$10	<\$1	<\$2	\$2-\$4	\$6-\$10
	RURAL							
Bangladesh	0.14	0.11	0.11	0.09	0.20	0.22	0.25	0.15
Brazil	0.02	0.06	0.15	0.10	0.03	0.09	0.17	0.14
Indonesia93	0.04	0.04	0.02	0.00	0.11	0.09	0.06	0.05
Indonesia97	0.21	0.12	0.07	0.02	0.24	0.19	0.15	0.14
Indonesia00	0.14	0.14	0.11	0.03	0.25	0.19	0.20	0.13
IvoryCoast	0.31	0.12	0.08	0.00	0.35	0.13	0.10	0.00
Mexico	0.30	0.21	0.14	0.10	0.32	0.21	0.14	0.14
Nicaragua	0.12	0.12	0.13	0.14	0.12	0.13	0.14	0.16
Pakistan	0.27	0.26	0.29	n.a	0.26	0.27	0.26	n.a
SouthAfrica	0.39	0.32	0.23	0.10	0.57	0.50	0.36	0.18
Timorleste	0.27	0.08	0.19	0.00	0.11	0.14	0.27	0.29
Udaipur	0.09	0.11	0.15	n.a	0.09	0.13	0.16	n.a
Vietnam92	na	0.16	0.21	0.14	na	0.27	0.25	0.22
URBAN								
Brazil	0.13	0.21	0.13	0.07	0.01	0.20	0.16	0.15
Indonesia93	0.05	0.04	0.03	0.04	0.19	0.15	0.07	0.04
Indonesia97	0.33	0.20	0.12	0.03	0.28	0.30	0.20	0.15
Indonesia00	0.26	0.20	0.11	0.10	0.54	0.29	0.22	0.20
IvoryCoast	0.32	0.16	0.09	0.00	0.34	0.24	0.10	0.00
Mexico	0.17	0.17	0.18	0.07	0.18	0.18	0.15	0.11
Nicaragua	0.17	0.11	0.09	0.07	0.20	0.22	0.21	0.16
Pakistan	0.25	0.25	0.22	0.38	0.23	0.23	0.20	0.30
SouthAfrica	0.39	0.34	0.25	0.10	0.68	0.54	0.34	0.12
Timorleste	0.14	0.11	0.15	0.04	0.16	0.12	0.17	0.02
Vietnam92	0.18	0.11	0.09	0.00	0.21	0.17	0.14	0.22