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Channels of impoverishment due to ill-health in rural Ethiopia

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Abstract

We[*] analyse the effects of ill-health on household economic outcomes in Ethiopia, using three years of household panel data and event history interviews. We examine the immediate effects of a variety of ill-health measures on health expenditure and labour supply, the subsequent household coping responses, and finally the effect on household income and consumption. We find evidence of substantial economic risk in terms of increased health expenditure and reduced agricultural productivity. Households cope by resorting to intra-household labour substitution, hiring wage labour, borrowing and depleting assets. While households are able to maintain food consumption, we observe imperfect insurance of non-food consumption. This effect is larger for households with the lowest ability to self-insure. Maintaining current consumption through borrowing and depletion of assets and savings is unlikely to be sustainable and displays the need for interventions that work towards reducing the financial consequences of ill-health.

Keywords

Health shocks, ill-health, consumption insurance, health expenditure, labour supply, poverty dynamics, Ethiopia.

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1. Introduction

In recent years academic and policy debates on poverty dynamics in low-income rural settings have highlighted the impoverishing effects of illnesses due to unexpected expenditure on health care and foregone income. The bulk of the existing studies on the economic consequences of ill-health have focused on consumption (for example Cochrane 1991, Foster 1994, Townsend 1994, Asfaw and von Braun 2004, Dercon et al. 2005, Gertler et al. 2009, and Davies 2010). The mixed evidence on the ability of households to insure consumption against ill-health warrants studies that examine the channels through which ill-health affects consumption and how households cope with the effects of ill-health (Chetty and Looney 2006). Identifying the channels through which ill-health influences consumption is instructive in order to understand the longer-term effects of ill-health and to determine the scope and welfare effects of public interventions.

A growing body of empirical literature has assessed the various links in this causal chain from ill-health to household consumption and potential poverty traps.[1] We contribute to this literature by offering a comprehensive analysis of different channels through which household economic welfare is affected in rural Ethiopia. We use three years of household panel data combined with event history interviews conducted with households that have recently experienced an episode of ill-health,

[1] For instance, Mohanan (2013) considered the effects of accidents on debt and consumption; Sparrow et al. (2014) and Bales (2013) consider the effects of ill-health on health expenditure, self-reported coping responses, income and consumption; Genoni (2012) traces the effects on assets, transfers, income and consumption; Islam and Maitra (2012) on assets, loans and consumption; Nguyet and Mangyo (2010) examine both labour supply and consumption; Wagstaff and Lindelow (2010) focus on health expenditure and consumption; Wagstaff (2007) on health expenditure, income and consumption; Lindelow and Wagstaff (2005) on labour supply, health expenditure and income; Gertler and Gruber (2002) on labour supply, health expenditure, income and consumption and Kochar (1995) on loans and income.

to analyse the effect of a variety of ill-health measures on household economic outcomes. We examine the immediate effects of ill-health on health expenditure and labour supply, the subsequent household coping responses and finally the effects of ill-health on household income and consumption.

In addition to examining a range of channels and economic outcomes we employ four ill-health measures of varying severity which reflect different dimensions of ill health. The magnitude of ill-health effects on economic welfare depends on the severity and type of health measure being used. For instance, Gertler and Gruber (2002) find that minor illnesses (*change in head's illness and chronic symptoms*) are insured while less frequent and severe illnesses (*limitations in physical functioning*) are not. Other papers report similar findings.[2] The existing evidence on Ethiopia (Asfaw and von Braun 2004, Dercon et al. 2005) does not make a distinction in terms of the severity of illness and results are mixed. While Dercon et al. (2005) reject the hypothesis of full consumption insurance against the *'illness of a household member*', Asfaw and von Braun (2004) find that food consumption is protected against the '*illness of the household head*' while non-food consumption is not insured.

To preview our results, we find that ill-health leads to an increase in health expenditure and a reduction in crop output. The effect on crop output occurs despite

[2] For instance, based on data from the United States, Cochrane (1991) analyzed the effect of '*short and long spells of illness (work days lost)*' on consumption growth and found that the former is insured while the latter is not. In an early study on India, Townsend (1994) reported that the '*percentage of year that an adult male is sick*' has no effect on household consumption. More recently, using data from Bangladesh, Islam and Maitra (2012) also find that household consumption is fairly well insured against '*incidence of illness, number of days of sickness and death of the main income earner*'. In contrast, Gertler et al. (2009) in Indonesia and Wagstaff (2007) in Vietnam report that consumption is sensitive to '*limitations in physical functioning*', and '*death of a working member, incidence of long spells of hospitalization and sizable drop in BMI of the head*', respectively.

intra-household labour substitution and hiring-in of labour, which may point to labour productivity differences and the use of productive resources for financing health care. Households cope by depleting livestock and by borrowing. While households are able to protect food consumption, we reject full consumption insurance in the case of non-food consumption particularly for households with the lowest ability to self-insure.

The Government of Ethiopia is currently considering a nation-wide roll-out of a pilot community based health insurance (CBHI) scheme which was introduced in 13 districts in mid-2011. Our results suggest that such health insurance schemes are likely to protect households against impoverishment by reducing their exposure to health expenditure and by reducing the need to borrow and resort to the sale of assets.

The rest of the paper is organized as follows. Section 2 outlines a framework which guides the subsequent analysis. Section 3 describes data and methods. Section 4 presents estimates while section 5 contains concluding observations.

2. Analytical framework

As depicted in Figure 1, the two immediate effects of ill-health are its effects on labour supply and on health expenditures. Depending on its severity, ill-health may affect both labour productivity and labour supply. Whether this translates into a reduction in crop output (income) in the current context, where households are primarily engaged in self-employed agriculture, is not clear. First, as noted by Kochar (1995), it depends on whether illness occurs in the slack or peak seasons. Second, since the need for specialized skills may not be as high as compared to other occupations, there is a greater possibility for intra-household labour substitution. In

addition, hiring in wage labour and/or inter-household labour substitution, for example, through local labour sharing arrangements may also help mitigate the labour supply consequences of ill-health, although hiring in labour does entail costs. Overall, the effect on income will depend on the effectiveness of a household's coping strategy, that is, whether it is possible to compensate for the entire reduction in labour supply and whether there are productivity differentials between the sick member and substituted labour.

Conditional on seeking medical care, the second source of financial risk is increased health expenditure. The implications of this for household income and consumption depend on how health care is financed. First, households may rely on savings (including sale of food stocks) to meet such costs. To the extent that the use of savings to finance medical care curtails the ability of households to invest or purchase agricultural inputs it may translate into reductions in crop output (income) and consumption. Second, households may sell livestock – the key household asset, and/or borrow in order to finance health care needs.[3] Such coping responses are likely to have deleterious consequences for future income and consumption, but they may allow households to protect current consumption. There are other coping possibilities, such as remittances from friends and relatives, which may have limited consequences for future income and consumption.[4] Notwithstanding this possibility,

[3] In his work on Ethiopia, Dercon (2004) notes that livestock is the most important marketable asset and accounts for more than 90% of the value of assets. The event-history interviews that we conducted revealed that selling livestock, especially smaller ruminants (sheep and goats) rather than larger animals is a common coping response.

[4] While relying on family and friends for support is a potential coping strategy, in a related paper (Yilma et al. 2014) we find that only 5% of households who have experienced a health shock in the year preceding the survey relied on such support.

the main point is that focusing only on consumption provides an incomplete picture of the consequences of ill-health.

As illustrated in Figure 1, we begin by examining the immediate effect of ill-health/health status of a household head on labour supply and health expenditure, this is followed by an assessment of the coping responses adopted by households.[5] Specifically, we consider the effects on intra-household labour substitution, livestock holdings and borrowing.[6] Finally, we provide an assessment of the effects of ill-health on income and consumption.

3. Data and Methods

a. Data

The study is based on three rounds of a panel household survey data collected in 16 rural districts (*Woredas*), located in four regions of Ethiopia (Tigray, Amhara, Oromiya, and SNNPR) that together account for about 86 percent of the country's population (Population Census Commission, 2008).[7] The surveys were conducted in March-April 2011, 2012 and 2013 and were purposively designed to gather information on a variety of ill-health measures of varying severity and to enable an analysis of the various channels through which these measures may influence household economic welfare. Within each district the surveys were canvassed in six randomly chosen *Kebeles* (peasant associations or villages). In each of the 96

[5] We focus on the health status of the household head as it is likely that this individual is the main bread winner. Asfaw and von Braun's (2004) paper on Ethiopia also focuses on the health status of the household head. Other papers such as Gertler and Gruber (2002), Lindelow and Wagstaff (2005) and Nguyen and Mangyo (2010) also focus on the health status of the household head.

[6] In principle we should also examine the effect of ill-health on household savings and gifts from family and friends. Unfortunately, we do not have data on savings.

[7] The study is part of a larger project designed to investigate the effects of pilot community based health insurance (CBHI) scheme which was launched in mid-2011. Twelve of the districts included in the survey host the CBHI scheme while one district in each region serves as a control.

Kebeles, 17 households were randomly surveyed, yielding a total of 1,632 households comprising 9,455 individuals. Of the original sample of households, 98% and 97% were re-surveyed in 2012 and 2013, respectively.

The survey contains information on a variety of individual and household socioeconomic attributes such as consumption expenditure, crop output, off-farm income, on-farm and off-farm labour supply, livestock holdings, household demographics, employment and household health conditions. The survey contains a detailed health module that asks respondents to provide for each household member age 6 and older, information on general health status (excellent, very good, good, poor, very poor), incidence of illnesses experienced in the two months preceding the survey, information on prolonged illnesses expressed as experiencing symptoms for more than 30 days, and information on the ability to carry out their activities of daily living (ADL). The ADL includes (i) stand up after sitting down, (ii) sweep the floor, (iii) walk for 5km or for an hour (if age 10 and older), (iv) carry 20 litres of water for 20 meters (if age 15 and older), and (v) hoe a field for three hours (if age 15 and older). The responses are then coded as '*can do it easily (code= 1), with a little difficulty (code=2), with a lot of difficulty (code=3)* and *not at all (code=4)*'.

In order to acquire a greater understanding of the mechanisms depicted in Figure 1, in January-February 2013, event history interviews were conducted with purposively selected households who had also been interviewed for the household survey. From each of the four regions, a district with a relatively high burden of ill-health was selected, and within each of the four districts, households were sampled

based on the reported incidence and severity of ill-health that they had experienced. A total of 42 households were interviewed.[8]

b. Measures of ill-health

We use information from the health module of the survey to construct four variables which capture the health status of a household head. First, any illness experienced in the two months preceding the survey may be characterized as a short-term measure of health status, which reflects less severe illnesses and with which it might be easier to cope. Second, longer spells of illness, reflected by illness symptoms that have been persisting for 30 days or more, may have more serious labour supply consequences and require costlier medical treatment. Third, self-assessed health (SAH) status is a measure that covers multiple dimensions of health.

A key issue with the use of self-reported illness and the SAH measure is that they are likely to be affected by a household's cultural and socio-economic background (Schultz and Tansel 1997; Islam and Maitra 2012).[9] For instance, the definition of good health is likely to vary by wealth and educational status. In addition, for the same objective health condition, it is possible that the better-off or those who are more informed, report a higher incidence of illness (Sindelar and Thomas 1991). Although these are valid concerns, the panel structure of the data

[8] Interviews were conducted with the household head or the spouse when the head was not available. We included 12 households which had been slightly affected by a health shock and 30 households which had been moderately or strongly affected by a health shock in 2012. The initial idea was to sample about 16 households per region. However, in each of the regions after about seven to eight interviews it was found that there was not much variation in the responses (so called saturation), and hence the final sample was reduced.

[9] For formal sector employees there are concerns that individuals may report that they are ill in order to justify reduced labour supply (reporting bias for the sake of sick leave). This is unlikely in the current case where we are dealing mainly with a sample of self-employed workers.

allows us to control for household fixed effects which should mitigate concerns about the effect of wealth and educational status on self-reported illnesses.

Perhaps a more objective health status indicator that is negatively related to income and education (Schultz and Tansel 1997; Gertler and Gruber 2002) is the ADL index, which is based on five self-rated abilities to carry out specific tasks. In contrast to self-reported illness measures, the ADL index is less likely to be endogenous to some of the outcome variables (for instance, labour supply). Our computation of this index follows Gertler and Gruber (2002) and Gertler et al. (2009) and is based on the algorithm developed by Stewart et al. (1990),

$$ADL_i = \left(\frac{Tscore_i - Minimum score}{Maximum score - Minimum score} \right)$$

where $Tscore_i$ is the sum of the scores on all the activities of daily living reported by individual i, while the minimum and maximum score relate to the minimum and maximum $Tscore$ in the data. The index takes the value one if an individual cannot perform any of the five activities (or is the least able individual in the sample) and a value of zero if the individual can perform all activities easily (or is the most able in the sample).

Descriptive statistics for the four health measures are provided in Table 1. In 2011, about 20% of household heads reported that they had experienced an illness in the two months preceding the survey. In 2012 and 2013 the incidence of illnesses was lower at 13.5 and 15.3%, respectively. The incidence of prolonged (and perhaps more severe) illnesses was lower and ranges between 5.4 to about 9%, depending on the year. The share of household heads reporting poor or very poor health status ranges between 6 to 9%. Consistent with the low incidence of poor health status, the

ADL index ranges between 0.051 and 0.080, which indicates that, on average, household heads are readily able to carry out most of the activities of daily living. Over time, based on all four measures, there are changes in health status, although poor self-assessed health status and the incidence of prolonged illnesses are relatively stable (about 11% of household heads report a change) as compared to recent illnesses (24%) and the ADL index (30%). The fluctuation in the ADL index is similar to findings reported in Gertler and Gruber (2002) and Gertler et al. (2009).

c. Outcome variables

We measure household expenditure on health care by aggregating costs incurred for outpatient and inpatient care, including traditional treatments. This includes expenditure on consultation, diagnostic tests, medicine and transportation. Information on outpatient care was reported for the two months preceding the survey while information on inpatient care was provided for the twelve months preceding the survey. We extrapolate the health care costs incurred for outpatient care and use annualized health expenditure as our outcome variable of interest.

The employment module of the survey records each household member's (age 6 and older) engagement in on-farm and off-farm activities in the four weeks preceding the survey.[10] The information includes the number of days worked and the average number of hours per day worked on both types of activities. The two variables that we use to capture labour supply are the total number of hours worked (both on and off-farm) in the four weeks preceding the survey by the household head and the rest of the members of the household.

[10] About 75% of households work exclusively on-farm.

Information on household holdings of livestock, the main household asset used to cope with the financial consequences of ill-health, is recorded for goats, sheep, calves, bulls and oxen. We use the number of different types of livestock owned rather than their monetary values. While this measure is less susceptive to reporting mistakes, it clearly does not account for differences in the quality of livestock. It is possible that using the number of different livestock may lead to an underestimate of the effect of ill-health on livestock ownership if households replace livestock that has been sold by smaller and lower quality animals. The probability of borrowing and the monetary value of all outstanding loans at the time of the survey are used to measure indebtedness.

Our measure of household income consists of two elements – the value of crop output and off-farm income. The survey gathered information on household annual output of 33 different crops. We use information on the per unit sales price of each crop to calculate the value of crop production. If a household did not sell a particular crop then we use the median district price of that crop to value crop output.[11] Off-farm income is calculated by multiplying the number of days worked in the past month by remuneration per day.[12]

Our surveys collected information on the quantity and monetary value of 41 food items consumed in the week preceding the survey and expenditure on 34 non-food items in the past month or year. This information is used to compute monthly

[11] If information on sales price was not available for particular crop in a particular *woreda* we worked with the median sales price for that crop in the zone.

[12] Information on off-farm income is restricted to those who work as employees and excludes income from off-farm self-employment. Income earned from such activities was not gathered. This is likely to lead to an underestimate of total income for 93 households who (at baseline) reported that a household member was engaged in off-farm self-employment activities.

per adult equivalent food and non-food consumption expenditures (excluding health expenditures).[13] Table 2 provides summary statistics of the outcome variables.

d. Methods

The empirical model that we use to examine the various channels outlined in Figure 1 is similar to the specification used in a number of studies in this genre (Gertler and Gruber 2002, Asfaw and von Braun 2004, Genoni 2012) and is written as,

$$\Delta(Y_{ivt}) = \alpha_0 + \alpha_1 T_t + \theta_v + \beta \Delta H_{ivt} + \sum_j \lambda_j \Delta X_{ivt} + \Delta \varepsilon_{ivt}. \quad (1)$$

For household i located in village v, we model changes in an outcome variable of interest (ΔY_{ivt}) as a function of a time dummy (*T*), a village fixed effect (θ_v), changes in the health conditions of the household head (ΔH_{ivt}), and changes in a vector of controls (ΔX_{ivt}) which includes household economic status (main occupation of the household head, asset index quintiles, membership in a productive safety net programme), demographics (age, sex and religion of the head and the age-sex composition of the household), human capital (educational status of the head), social capital (if the household has someone to rely on in times of difficulties), the incidence of shocks in the twelve months preceding the survey (economic, natural and crime-conflict related) and a random error term $(\Delta \varepsilon_{ivt})$.[14] Our focus is on the

[13] We use the adult equivalent measures suggested by Dercon and Krishnan (1998). The average family size is about 4.8 adults.

[14] The asset index is constructed on the basis of a principal components analysis of 68 items including housing conditions, land size, consumer durables, farm equipment and livestock. For specifications where livestock is a dependent variable we exclude the asset index. The productive safety net program is a social protection program intended for food insecure households.

coefficient, β, which reflects the sensitivity to ill-health.[15] We estimate several variants of (1) using different empirical methods, depending on the nature of the dependent variable, and provide robust standard errors clustered at the village level.

The use of a difference specification allows us to identify the effect of ill-health on various outcomes after controlling for the effects of time-invariant observed and unobserved variables. For instance, a household's unobserved health endowment is likely to be correlated with the ill-health measures and labour supply and might confound estimates of the effect of illness on labour supply. However, as long as such endowments are time-invariant, estimates based on (1) will not be affected.[16] The set of village fixed-effects controls for village-specific differences in, among others, susceptibility to covariate shocks. To control for time-varying household specific shocks we estimate (1) with the inclusion of a set of variables that captures the incidence of natural, economic and crime/conflict related shocks.

Despite relying on a difference specification and the inclusion of various controls, there are additional empirical issues that warrant a discussion. For a number of the outcome variables, such as health expenditure or the value of outstanding loans, the distributions are censored at zero and skewed. One possibility is to work with logged values of the variables and we do so in the case of consumption where we log consumption before differencing. For the other outcome

[15] Specifically in the case of consumption, theory predicts that either through self-insurance mechanisms (such as savings) or inter-household risk sharing arrangements (support from friends and relatives) or borrowing and selling assets, households will aim to insulate consumption from transitory shocks to household income. That is, the coefficient on the measure of ill-health should not be statistically different from zero. Although households may adopt various coping measures, each of which might be difficult to observe, the test of full insurance measures the overall contribution of all coping responses.

[16] Additionally, to the extent that the ill-health measures, and for that matter other variables, are measured with error, differencing the data will eliminate time-invariant measurement error.

variables, due to zero values we work with levels. However, since the outcome variables are in first differences, skewness is minimized even without a log transformation.[17] Thus, similar to Gertler and Gruber (2002), the tables reported in the main body of the paper are based on using OLS or logit models with changes in log consumption and changes in levels of other outcomes as dependent variables.

Nevertheless, as robustness check and to probe the sensitivity of our results to the choice of specification, we also use several alternative models that are commonly applied to deal with such non-normal distributions. Following Genoni (2012), who argues that a quartic root is a good approximation to the log transformation for positive values, we also estimated (1) using changes in the quartic root of the outcome variables (Table 3B). With regard to health expenditure, Buntin and Zaslavsky (2004) note that zero observations can be accommodated without difficulty by employing one part generalized linear models. To this end, we also estimated the effect of ill-health on health expenditure using a Poisson fixed effects model (Table 3C).[18] Finally, we estimated equation (1) by adding 1 to the variables with zero outcomes and then taking logs and differencing the variables (Table 3D).

Changes in the health measures used in (1) and a number of the outcome variables may be simultaneously determined. For instance, household-specific changes in income due to crime or conflict may also have adverse effects on health outcomes. Several remarks are in order. First, we explicitly control for the incidence

[17] Typically, for almost all the outcome variable, first differences are evenly distributed over negative and positive values around a zero mean.

[18] While we are more interested in health expenditure and not just the probability of incurring health expenditure we also estimated two part models considering a) probit for the probability of spending b) expected log health expenditure given spending using OLS c) expected health expenditure using a generalized linear model with log link and gamma distribution. Regardless of the model, as is discussed later in the text, we find that all four measures of ill-health are associated with increases in the probability of spending and the amount spent on health care.

of natural, economic and conflict/crime related shocks in (1). Second, we use several measures of ill-health and while the self-reported illness measures are more likely to be susceptible to feedback effects it is less likely that the ADL index is as prone to such feedback effects. For instance, concerted labour effort is more likely to translate into illness as compared to influencing the ability of individual to engage in various activities of daily living.

The effect of ill-health on consumption estimated with equation (1) may also be misleading if ill-health alters preferences. Conventional tests of consumption insurance assume that preferences are stable. However, if changes to health status induce changes in consumption preferences then this may confound the estimates of β in equation (1). In our empirical work we control for changes in demographic variables that may lead to a preference shift. Furthermore, we examine the effect of ill-health affecting a household head on household consumption. Considering that the average household size in our baseline data is almost six, it seems unlikely that the health of the head will drive changes in household consumption preferences. To assess potential preference shifts we use a test suggested by Gertler and Gruber (2002). We examine how estimates of (1) vary by the ability of a household to self-insure.[19] If the effect of ill-health on consumption is due to changes in the budget constraint, then full consumption insurance will be less likely to hold as the ability to self-insure reduces. On the other hand if health induced preferences play a dominant role then the effect of ill-health on consumption should not be correlated with the ability to self-insure. Our measure of self-insurance ability is household ownership of

[19] While the idea behind the test is the same, the manner in which we operationalize the ability to self-insure is different from that used by Gertler and Gruber (2002).

livestock (sheep, goats, calves and bulls) in the first round of the survey. As discussed earlier, selling livestock, especially smaller ruminants, is often used to finance health care and in the current context serves as our measure of the ability of a household to self-insure.[20]

A final concern is that the introduction of the community based health insurance scheme during the time period covered by the data may potentially confound estimates based on (1). While an evaluation of the scheme is beyond the scope of this paper and the variable is excluded from our baseline specification we do examine the sensitivity of our estimates to household uptake of the scheme (Table 3A, 4A and 5A).

4. Estimates

a. Effects on health expenditure and labour supply

Estimates of the effect of the four health measures on annual health expenditure are reported in column 1 of Table 3. All the measures show that experiencing an illness or deterioration in health status leads to a statistically significant increase in health expenditure. For instance, households experiencing an illness in the two months preceding the survey are likely to experience an 874 Birr increase in annual household health expenditure while those who experience prolonged illness may expect to spend about 1,100 Birr on health care. These figures amount to between 4.1 and 5.3% of annual household consumption in 2012.[21] A change in the household head's health status to poor/very poor is associated with an expenditure increase of

[20] The event-history interviews revealed households tend to selling sheep and goats rather than larger animals. Of the 1599 households in the second round, 26% did not have any of these animals (buffer stock livestock) while the rest have at least one.

[21] In 2012, on average, annual household consumption was Birr 21,139.

about 793 Birr a year while a deterioration in the ADL index of 0.2, which is equivalent to a movement from being able to easily do all the activities included in the index to an inability to execute one of them, is associated with additional expenditures of about 334 Birr a year.[22]

Column 2 of Table 3 provides estimates of the effect of the various health measures on the labour supply of the household head while columns 3 and 4 contain labour supply estimates for other household members and the household as a whole, respectively. Deteriorations in self-assessed health status and in the ADL index are associated with reductions in labour supply of between 12 and 17 hours per month (13 to 19% of average household head labour supply in 2012). The two illness measures do not translate into statistically discernible effects on the labour supply of the household head. It is of course possible that the household head continues to supply the same amount of labour but is not as productive, an issue we could not directly test.

b. Coping Responses

The decline in the labour supply of the household head is matched by an increase in the labour supply of other members of the household. This applies for all the health measures, although the effect is precisely estimated only in the case of recent illnesses. The overall outcome of this process of adjustment is that at the level of the household an illness episode or deterioration in health status does not translate into a reduction in labour supply. In the case of three of the four illness measures, the increase in labour supply provided by other household members is larger than the

[22] The mean change in the ADL index among those whose physical functioning declines is 0.22.

reductions in labour supply. The event-history interviews also provided evidence of intra-household labour substitution. For instance,

"I mostly feel sick partly due to old age but my children are healthy. In this month, I went to a private clinic in Woreta [nearest town] due to a worm in my foot... It took about 15 days till I completed the medication and I was not working but my children did the work well. All of them are grown-ups and I have educated them. [Male respondent, Woji Arbamba Kebele of Amhara region, Interview conducted on 31st January 2013]"

While households might be able to (over-) compensate for health-induced reductions in the labour supply of the household head, due to differences in productivity or the need to raise resources to finance required health care there may still be negative consequences.[23] In addition to loss of income such consequences include loss of leisure time, and if households draw on child work then it may come at the cost of school attendance. The event-history interviews show that the choice can be difficult especially if households need to rely on school-going children,

"My husband had something in his leg over a weekend… In total he was sick for over two weeks and did not do anything. He wanted our son to miss school and work on the field but my son refused as it was an exam time. I supported him because his attendance at school for the whole year would mean nothing if he doesn't sit for an exam. We then left the farm unattended. There was some crop output eaten by livestock during that time. The animals belonged to our relatives and we couldn't sue them. [Female respondent, Woji Arbamba Kebele of Amhara region, Interview conducted on 1st February 2013]"

We are not able to identify, at least statistically, the effects of ill-health on the use of wage labour as a coping response (due to data unavailability). However, the event history interviews reveal that households do use this option. As mentioned by one of the respondents,

"Recently I had typhoid… Because we may lose output/ income when we fall ill, I employed labour for 500 birr to transport my harvest. I wouldn't have spent this

[23] In Indonesia, Genoni (2012) also finds suggestive evidence for intra-household labour substitution.

much if I was not ill. There is no one to do the work at home as my husband is in a seasonal migration and my children are too young. [Female respondent, Kebabi Kebele of Tigray region, Interview conducted on 22 January 2013]"

Other coping responses include borrowing and the sale of assets. Estimates of equation (1) for the probability of borrowing and the amount of the loan are provided in columns 1 and 2 of Table 4, while the remaining columns pertain to the effects of ill-health on household livestock holdings. All measures of ill-health lead to an increase in the probability of having an outstanding loan. Depending on the health measure, the probability of borrowing is 1.7 to 2.6 times higher if a household head has experienced a negative health change, while 3 of the 4 health measures are associated with increases in the amount of the loan. For a household head experiencing deterioration in physical functioning equal to the average observed for the sub-sample that saw a fall in the ADL index (0.22 points), loan amounts may be expected to increase by 93 Birr. Illnesses and unfavourable changes in SAH are associated with increases in borrowing of 277 and 289 Birr, respectively. Prolonged illness is also associated with an increase in the loan amount but the coefficient is not statistically significant. To place this effect in perspective, consider that the increases in borrowing associated with changes in the three health measures (which are statistically significant) amount to between 25 and 36% of the increase in health expenditure induced by these measures.[24]

Consistent with the comments distilled from the event history interviews we find that households tend to sell smaller ruminants in response to ill-health. As shown in Table 4, a worsening of the SAH status of the household head and a decline

[24] These percentages are based on estimates reported in Tables 3 and 4. In the case of SAH status, ill-health increases borrowing by 289 Birr and health expenditure by 793 Birr. For illness the corresponding figures are 277 and 874 and in the case of ADL they are 93 and 367 (at the average change in ADL).

in the ADL index are both associated with declines in household holdings of sheep.[25] The estimates imply that for every 10 households that experience a decline in SAH status, almost 4 sell a sheep to finance health care needs. In the case of the ADL index, for every 10 household heads who experience the average deterioration observed in the sample about 1 will sell livestock (sheep). There is no effect on household holdings of bulls and calves while change in ADL has some negative effect on ox holding. As discussed earlier, focusing only on the number of animals may not provide a complete picture as smaller and lower quality sheep/goats may have replaced household livestock holdings.

c. Effect on income and consumption

The analysis so far shows that the increase in health expenditure and the decline in the labour supply of the head of the household due to ill-health are compensated through increases in intra-household labour substitution, borrowing and sales of small ruminants. Yilma et al. (2014) show that financial support from family and friends is very limited and in addition to sales of assets and borrowing, households rely on savings to meet their health care needs. As long as this saving is earmarked for productive purposes, it might compromise productivity.

Estimates reported in Table 3, columns 5 and 6 display a clear negative association of ill-health with crop output and total income. The estimates for crop output are statistically significant and large while those for total income are also large but not very precise. In terms of magnitude, the decline in annual household income due to a decline in the self-reported health status amounts to about 10% of

[25] We also estimated this effect using 'Tropical Livestock Unit' as a dependent variable. Results are statistically significantly negative only for ADL (results are not reported but could be available upon request).

annual household income in 2012. For the two illness measures the effect lies between 10 and 19% of annual household income, but in contrast to the effects on crop output the estimates for total income are not statistically significant. However, these imprecise effects for total income do not provide evidence of households' ability to compensate for losses in crop output by resorting to off-farm income-generating activities, especially given the fact that the point estimates for two of the four ill-health measures suggest a larger decline in total income than crop output.

The observed decline in crop output despite finding no evidence of reduced total household labour supply could suggest that intra-household labour substitution involves a cost in terms of reduced labour productivity. Alternatively, the event history interviews tend to suggest that crop output is affected by the diversion of household savings to finance health care needs as opposed to being used to buy agricultural inputs. For instance, consider,

"My wife is sick of modern illness, TB. She is recurrently sick and goes to health facilities quite often. I spent around 5000 birr. Her illness has affected our harvest. Because of health expenditure, I couldn't buy inputs of production (high yield seeds and fertilizer) on time and hence, reduced my output. [Male respondent, Oumbulo Tenkaka Kebele of SNNPR, Interview conducted on 11th February 2013]"

"My daughter had a stomach complaint for more than a week. I took her to a traditional healer but she couldn't get better. Then, I took her to a health center... I spent 300 birr for that. Due to her illness, I didn't work on my vegetable garden. As I used the money I put aside for seeds, I ran out of cash to buy the seeds to plant my vegetables. Although, after sometime, I worked off-farm (dig-out sand and sell) and planted vegetables, I do not expect as much output as I planted it late. [Male respondent, Jara Damuwa Kebele of SNNPR, Interview conducted on 15th of February 2013]"

Finally, following Figure 1, we examine the effect of ill-health on consumption, both for the full sample and for sub-groups based on self-insuring ability (own buffer stock/livestock or not). Focusing on the full sample, the estimates

reported in Table 5 show that, regardless of the ill-health measure, there is no effect on total consumption. In fact, in the case of the ADL index there is a positive although statistically insignificant effect while for the other measures the coefficients are essentially zero.[26] Food consumption also displays a similar pattern except in the case of ADL where it is significantly positive. The estimates for non-food consumption are clearly more sensitive to ill-health and in the case of prolonged illnesses the estimates indicate an 8% reduction in non-food consumption. For other measures non-food consumption remains unaffected. The finding that non-food consumption is more sensitive to ill-health than food consumption is similar to results for Ethiopia reported in Asfaw and von Braun (2004) and Sparrow et al. (2014) for Indonesia.

Conditioning on households' ability to self-insure we find that across all health measures, those with a lower ability to self-insure experience a negative although statistically insignificant effect on total consumption and food consumption. It is only in the case of non-food consumption that such households experience large negative effects. Prolonged illness and deterioration in SAH are associated with a reduction of 15% and 26%. Consumption for those with a greater ability to self-insure remains unaffected except in the case of ADL where we find a positive effect. The latter could happen if better-off households should (and are able to) consume more for a faster recovery. In the Ethiopian context, killing animals for their meat, an expensive diet, is common especially if limitation in performing the

[26] Gertler and Gruber (2002) and Gertler et al. (2009) reject the hypothesis of full consumption insurance against limitations in physical functioning. Using data from Indonesia, Genoni (2012) finds that neither consumption nor assets are responsive to limitations in physical functioning. In the current case, although there is no effect on consumption, we do find an increase in indebtedness and depletion of assets induced by limitations in physical functioning.

ADLs is due to accidents. Moreover, for the better off, fast recovery might induce more expensive non-food expenditure that relate to costs of care. This heterogeneity supports the argument that the effects of ill-health on consumption are driven by tighter budget constraints as opposed to preference shifts. Additionally, the different patterns suggest that it is ill-health induced reductions in income and labour supply that influence consumption and not the reverse. The effect heterogeneity results presented here are similar to those found in Indonesia by Gertler and Gruber (2002), Gertler et al. (2009) and Sparrow et al. (2014).

5. Concluding remarks

This paper used three waves of panel data and event history interviews conducted in rural Ethiopia to examine i) the channels of impoverishment due to ill-health ii) the coping responses adopted by households, and iii) the effects on current household economic welfare (income and consumption).

We find that there is substantial economic cost due to forgone crop output and increased health expenditure. Although the labour supply of the household head declines due to ill-health, intra-household labour substitution limits the overall reduction in household labour supply. However, possibly due to productivity differences between the head's labour and the substituted labour and diversion of productive resources for health care, there is a decline in household agricultural productivity. We also find that ill-health is associated with asset depletion, increases in the probability of indebtedness and increases in the amount of outstanding loans. We did not find evidence to reject the null hypothesis of food consumption insurance against ill-health (full sample). However, non-food consumption declines

for certain measures of ill-health. This effect is magnified for households with the lowest ability to self-insure.

The results presented in this paper support the recent move of the Government of Ethiopia to expand and scale-up a pilot community based health insurance scheme. Given the effects of ill-health on asset depletion and household indebtedness, both of which are likely to exert negative effects on consumption in the long-run, such a scheme may provide protection against future vulnerability.

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Tables and Figures

Figure 1
Conduits of impoverishment due to ill-health

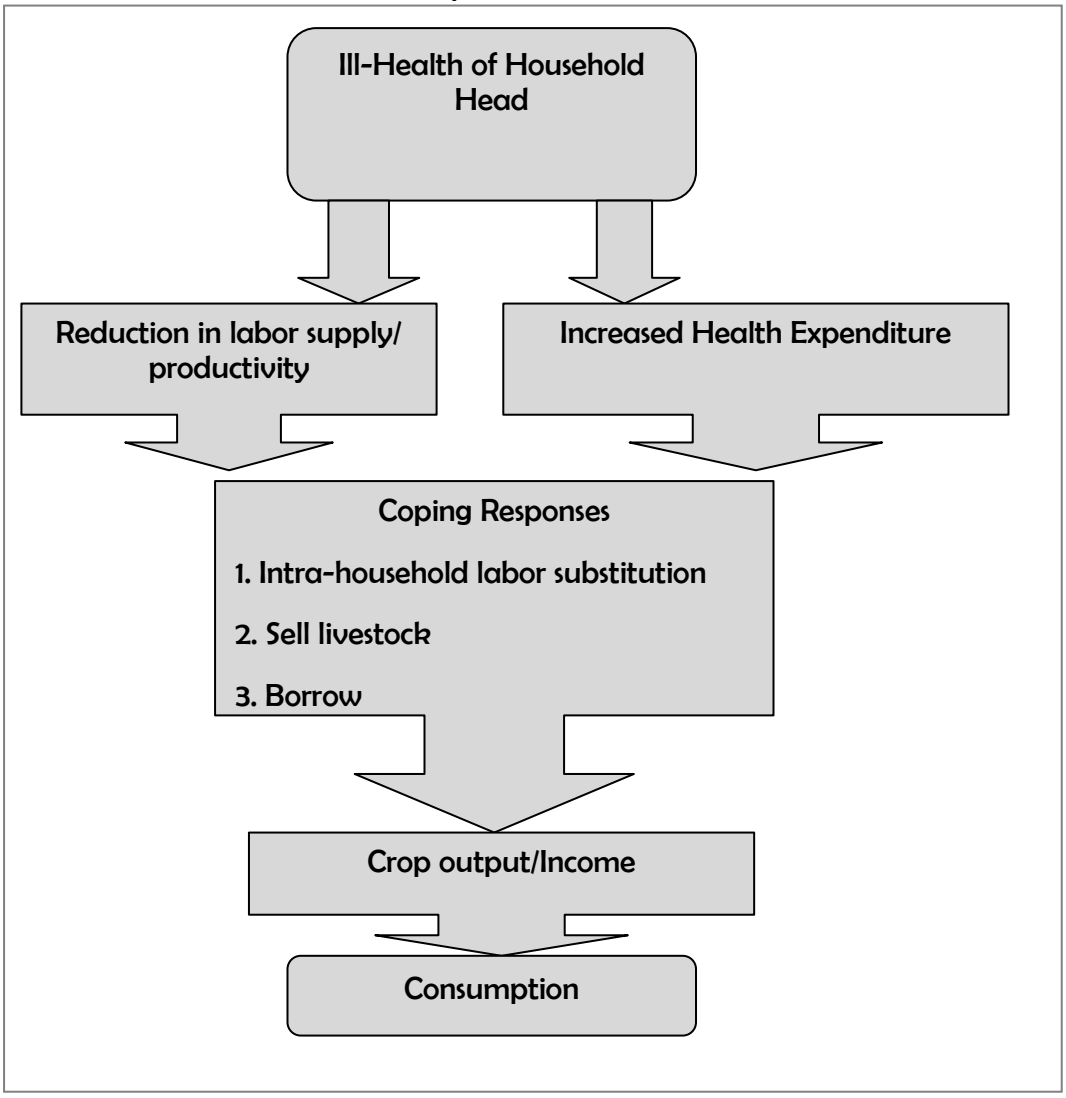

Table 1
Summary statistics of health measures of the household head

Health measures	Mean / percent of household heads			Change 2011-2012 (percent of household heads)			Change 2012-2013 (percent of household heads)		
	2011	2012	2013	Improve	Same	Worsen	Improve	Same	Worsen
Activities of daily living (ADL) index	0.051 (0.147)	0.058 (0.159)	0.080 (0.187)	10.7	74.1	15.2	14	66.1	19.9
Prolonged illness (symptoms for more than 30 days)	9.1	5.4	6.2	7.8	88.1	4.1	4.3	90.4	5.3
Illness in the two months preceding the survey	20.1	13.5	15.3	15.9	74.4	9.7	10.8	76.7	12.5
(Very) Poor Self-Assessed Health Status	6.1	6.2	8.9	4.5	90.9	4.6	4.9	87.2	7.8

Notes: All health measures except for the ADL index are dummy variables. For ADL standard deviations are reported in parentheses. Number of observations in 2011, 2012 and 2013, depending on the health measure, range between [1627-1632], [1582-1597] and [1566-1583] respectively.

Table 2
Means and standard deviations of outcome variables

Outcome variables	2011	2012	2013	Outcome variables	2011	2012	2013
Total consumption	249	367	406	Goats #	0.957	1.04	1.109
	(162)	(692)	(529)		(3.754)	(3.834)	(3.235)
Food consumption	206	303	340	Sheep #	1.331	1.365	1.377
	(138)	(679)	(515)		(2.764)	(3.153)	(2.957)
Non-food consumption	43	64	66	Calves #	0.651	0.687	0.654
	(42)	(83)	(61)		(1.019)	(1.238)	(1.944)
Crop output (year)	7758	10781	11409	Bulls #	0.366	0.338	0.371
	(14137)	(23369)	(16184)		(1.013)	(1.085)	(1.417)
Total income (year)	9354	12024	13574	Oxen #	1.061	1.031	1.042
	(17306)	(18572)	(17222)		(1.139)	(1.53)	(1.198)
Health expenditure (year)	359	393	353	Total labour supply	229	225	262
	(1276)	(1624)	(1405)	(household)	(247)	(213)	(215)
Outstanding loan	666	635	798	Total labour supply (head)	92	89	102
	(1450)	(1432)	(1970)		(77)	(76)	(82)
				Total labour supply (others)	137	137	160
					(206)	(170)	(177)

Notes: Unless specified the variables are in monthly terms; standard deviations are in parentheses; Number of observations in 2011, 2012 and 2013, depending on the outcome variable, range between [1539-1632], [1473-1599] and [1471-1583] respectively.

Table 3
Effect on health expenditure, labour supply and income

	Health expenditure	Labour supply (head)	Labour supply (others)	Labour supply (household)	Crop output	Total income
ADL index	1,670***	-17.06*	36.94	25.31	-3,180	-3,527
	(542.8)	(9.463)	(30.16)	(35.56)	(2,048)	(2,476)
Prolonged illness	1,108***	1.355	20.82	21.22	-1,247*	-802.3
	(301.5)	(4.767)	(12.91)	(14.17)	(637.2)	(1,933)
Illness	873.9***	-0.260	16.50**	15.52	-2,008**	-564.6
	(168.1)	(3.307)	(7.889)	(9.724)	(914.5)	(850.5)
(Very) poor SAH	792.7***	-12.23***	10.54	-4.556	-1,234*	-1,577
	(254.0)	(4.648)	(14.78)	(17.27)	(687.5)	(1,006)

Notes: Each coefficient is from a separate linear regression of equation (1). Number of observations ranges between [2664-3106]. Not reported but included in the specification are village fixed effects and measures of economic status, human capital, social capital, demographics, religion, year and shock dummies. Clustered standard errors (at Kebele/village level) are reported in parentheses.
Statistical significance: * 10%, ** 5%, *** 1%.

Table 4
Effect on indebtedness and asset stock

	Any loan	Loan amount	Goat	Sheep	Bulls	Calves	Oxen
ADL index	2.575**	422.3**	-0.198	-0.620**	-0.0659	-0.172	-0.164*
	(1.170)	(187.7)	(0.377)	(0.285)	(0.0856)	(0.109)	(0.0891)
Prolonged illness	1.666**	106.0	-0.152	-0.181	0.000700	0.0278	-0.0506
	(0.345)	(92.81)	(0.137)	(0.141)	(0.0463)	(0.0622)	(0.0351)
Illness	2.028***	277.1***	-0.0552	-0.0568	0.0203	-0.0139	-0.0314
	(0.295)	(86.29)	(0.0984)	(0.110)	(0.0468)	(0.0441)	(0.0289)
Poor/very poor SAH	1.820***	288.9**	-0.127	-0.364**	-0.0128	-0.0401	-0.0201
	(0.383)	(133.4)	(0.130)	(0.167)	(0.0492)	(0.0646)	(0.0394)

Notes: Each coefficient is from a separate regression of equation (1). The column labelled, "Any loan", contains odds ratios from a logit fixed-effects model. Number of observations for this column ranges between [1892-1926]. The rest of the coefficients are from linear regression estimates of (1). Number of observations for these ranges between [3063-3110]. Not reported but included in the specification are village fixed effects and measures of economic status, human capital, social capital, demographics, religion, year and shock dummies. Clustered standard errors (at Kebele/village level) are reported in parentheses.
Statistical significance: * 10%, ** 5%, *** 1%.

Table 5
Consumption insurance

		Total	Food	Non-food
ADL index	Full sample	0.116	0.158*	0.167
		(0.0789)	(0.0816)	(0.117)
	Poor	-0.132	-0.0862	-0.165
		(0.138)	(0.153)	(0.208)
	Non-poor	0.222**	0.278***	0.280**
		(0.0958)	(0.0916)	(0.136)
Prolonged illness	Full sample	0.00522	0.0203	-0.0835*
		(0.0292)	(0.0327)	(0.0454)
	Poor	-0.0807	-0.0747	-0.150*
		(0.0516)	(0.0653)	(0.0888)
	Non-poor	0.0424	0.0603	-0.0530
		(0.0430)	(0.0447)	(0.0649)
Illness	Full sample	0.000158	0.00873	-0.0328
		(0.0287)	(0.0295)	(0.0352)
	Poor	-0.0551	-0.0392	-0.0510
		(0.0627)	(0.0618)	(0.0765)
	Non-poor	0.0114	0.0190	-0.0326
		(0.0306)	(0.0319)	(0.0394)
(Very) poor SAH	Full sample	0.0119	0.0262	-0.00925
		(0.0382)	(0.0389)	(0.0512)
	Poor	-0.121	-0.0922	-0.265***
		(0.0793)	(0.0836)	(0.0929)
	Non-poor	0.0590	0.0709	0.0775
		(0.0432)	(0.0440)	(0.0554)

Notes: Each coefficient is from a separate linear regression of equation (1). Number of observations for the full sample, 'poor' sample and 'non-poor' sample range between [2936-3077], [747-783] and [2189-2294] respectively. Not reported but included in our specification are village fixed effects and measures of economic status, human capital, social capital, demographics, religion, year and shock dummies. All dependent variables are log-transformed. Clustered standard errors (at Kebele/village level) are reported in parentheses.
Statistical significance: * 10%, ** 5%, *** 1%.

Appendix

Table 3A
Effect on health expenditure, labour supply and income
(robustness check for inclusion of CBHI)

	Health expenditure	Labour supply (head)	Labour supply (others)	Labour supply (household)	Crop output	Total income
ADL index	1,670***	-17.01*	36.56	25.16	-3,132	-3,484
	(540.8)	(9.528)	(30.15)	(35.63)	(2,049)	(2,469)
Prolonged illness	1,108***	1.406	20.95	21.39	-1,247*	-805.7
	(301.9)	(4.766)	(12.94)	(14.22)	(638.4)	(1,931)
Illness	876.3***	-0.188	16.68**	15.84	-2,017**	-591.8
	(168.6)	(3.316)	(7.918)	(9.751)	(910.2)	(852.2)
(Very) poor SAH	792.4***	-12.23***	10.62	-4.476	-1,232*	-1,559
	(253.7)	(4.638)	(14.82)	(17.33)	(688.4)	(1,005)

Notes: Each coefficient is from a separate linear regression of equation (1). Number of observations ranges between [2662-3104]. Not reported but included in the specification are village fixed effects and measures of economic status, human capital, social capital, demographics, religion, year and shock dummies. Clustered standard errors (at Kebele/village level) are reported in parentheses.
Statistical significance: * 10%, ** 5%, *** 1%.

Table 3B
Effect on health expenditure, labour supply, income and loans
(Quartic root dependent variable)

	Health expenditure	Labour supply (head)	Labour supply (others)	Labour supply (household)	Crop output	Total income	Loan amount
ADL index	1.548**	-0.777***	0.0783	-0.139	-1.091**	-0.873	1.046**
	(0.614)	(0.167)	(0.242)	(0.191)	(0.448)	(0.530)	(0.405)
Prolonged illness	1.919***	-0.144	0.138	0.0713	-0.532***	-0.469*	0.515**
	(0.268)	(0.0886)	(0.120)	(0.0842)	(0.179)	(0.250)	(0.213)
Illness	2.314***	-0.127**	0.217***	0.0938*	-0.277**	-0.253*	0.609***
	(0.176)	(0.0500)	(0.0726)	(0.0485)	(0.120)	(0.134)	(0.146)
(Very) poor SAH	1.481***	-0.396***	0.0945	-0.0918	-0.370**	-0.473**	0.555***
	(0.302)	(0.0820)	(0.138)	(0.0937)	(0.171)	(0.191)	(0.206)

Notes: Each coefficient is from a separate linear regression of equation (1). Number of observations ranges between [2664-3110]. Not reported but included in the specification are village fixed effects and measures of economic status, human capital, social capital, demographics, religion, year and shock dummies. All dependent variables are have undergone a quartic root transformation. Clustered standard errors (at Kebele/village level) are reported in parentheses.
Statistical significance: * 10%, ** 5%, *** 1%.

Table 3C
Effect on health expenditure:
Poison fixed effects and two part models

	Poisson fixed effects	Two part models: Cross-section		
		Probit (First part)	OLS in log (Second part)	GLM (second part)
ADL index	2.600***	0.280***	1.087***	1.559***
	(0.556)	(0.0711)	(0.288)	(0.309)
Prolonged illness	1.483***	0.384***	0.534***	0.628***
	(0.211)	(0.0307)	(0.104)	(0.123)
Illness	1.562***	0.484***	0.321***	0.340***
	(0.159)	(0.0240)	(0.0836)	(0.102)
Poor/very poor SAH	0.996***	0.304***	0.342***	0.483***
	(0.210)	(0.0363)	(0.111)	(0.134)

Notes: Each coefficient is from a separate regression. Number of observations for the first column ranges between [2821-2849]. Number of observations for the first part of the two part models ranges between [4750-4767]. For the second part it ranges between [1444-1453]. Control variables include measures of economic status, human capital, social capital, demographics, religion, shock dummies, year dummies and village dummies. Robust standard errors [column 1] and standard errors clustered at Kebele/village level [column 2-4] are reported in parentheses. GLM is estimated using log link and gamma distribution.
Statistical significance: *10%, ** 5%, *** 1%.

Table 3D
Effect on health expenditure, labour supply, income and loan
(Log (Y+1) dependent variable)

	Health expenditure	Labour supply (head)	Labour supply (others)	Labour supply (household)	Crop output	Total income	Loan amount
ADL index	1.415**	-1.123***	0.0671	-0.241	-0.851**	-0.629	1.193**
	(0.646)	(0.245)	(0.328)	(0.251)	(0.336)	(0.405)	(0.471)
Prolonged illness	2.118***	-0.218*	0.174	0.0730	-0.342**	-0.399**	0.615**
	(0.288)	(0.128)	(0.165)	(0.110)	(0.154)	(0.179)	(0.246)
Illness	2.732***	-0.195***	0.305***	0.117*	-0.127	-0.217**	0.676***
	(0.193)	(0.0719)	(0.100)	(0.0609)	(0.0978)	(0.0998)	(0.161)
(Very) poor SAH	1.641***	-0.572***	0.128	-0.130	-0.266*	-0.375**	0.620**
	(0.322)	(0.118)	(0.188)	(0.117)	(0.141)	(0.147)	(0.237)

Notes: Each coefficient is from a separate linear regression of equation (1). Number of observations ranges between [2664-3110]. Not reported but included in the specification are village fixed effects and measures of economic status, human capital, social capital, demographics, religion, year and shock dummies. All dependent variables are log-transformed (log(Y+1)). Clustered standard errors (at Kebele/village level) are reported in parentheses.
Statistical significance: * 10%, ** 5%, *** 1%.

Table 4A
Effect on indebtedness and asset stock
(robustness check for CBHI inclusion)

	Any loan	Loan amount	Goat	Sheep	Bulls	Calves	Oxen
ADL index	2.646**	420.9**	-0.203	-0.622**	-0.0656	-0.170	-0.165*
	(1.209)	(188.0)	(0.377)	(0.284)	(0.0856)	(0.109)	(0.0889)
Prolonged illness	1.680**	105.7	-0.149	-0.181	0.000665	0.0274	-0.0505
	(0.349)	(92.92)	(0.137)	(0.141)	(0.0463)	(0.0623)	(0.0351)
Illness	2.065***	277.4***	-0.0538	-0.0569	0.0200	-0.0131	-0.0323
	(0.302)	(86.24)	(0.0982)	(0.110)	(0.0468)	(0.0442)	(0.0290)
Poor/very poor SAH	1.813***	289.0**	-0.127	-0.364**	-0.0126	-0.0406	-0.0197
	(0.383)	(133.4)	(0.130)	(0.167)	(0.0492)	(0.0646)	(0.0394)

Notes: Each coefficient is from a separate regression of equation (1). The column labelled, "Any loan", contains odds ratios from a logit fixed-effects model. Number of observations for this column ranges between [1892-1926]. The rest of the coefficients are from linear regression estimates of (1). Number of observations for these ranges between [3061-3108]. Not reported but included in the specification are village fixed effects and measures of economic status, human capital, social capital, demographics, religion, year and shock dummies. Clustered standard errors (at Kebele/village level) are reported in parentheses.
Statistical significance: * 10%, ** 5%, *** 1%.

Table 5A
Consumption insurance
(robustness check for CBHI inclusion)

		Total	Food	Non-food
ADL index	Full sample	0.117	0.159*	0.167
		(0.0787)	(0.0814)	(0.117)
	Poor	-0.132	-0.0857	-0.165
		(0.139)	(0.153)	(0.210)
	Non-poor	0.222**	0.279***	0.280**
		(0.0952)	(0.0908)	(0.136)
Prolonged illness	Full sample	0.00450	0.0198	-0.0840*
		(0.0294)	(0.0329)	(0.0454)
	Poor	-0.0808	-0.0750	-0.150*
		(0.0517)	(0.0654)	(0.0888)
	Non-poor	0.0406	0.0589	-0.0540
		(0.0430)	(0.0449)	(0.0647)
Illness	Full sample	0.000358	0.00913	-0.0332
		(0.0286)	(0.0293)	(0.0354)
	Poor	-0.0551	-0.0392	-0.0509
		(0.0628)	(0.0618)	(0.0764)
	Non-poor	0.0108	0.0186	-0.0338
		(0.0303)	(0.0318)	(0.0395)
(Very) poor SAH	Full sample	0.0114	0.0257	-0.00929
		(0.0383)	(0.0392)	(0.0513)
	Poor	-0.121	-0.0931	-0.266***
		(0.0794)	(0.0838)	(0.0927)
	Non-poor	0.0569	0.0686	0.0766
		(0.0429)	(0.0437)	(0.0554)

Notes: Each coefficient is from a separate linear regression of equation (1). Number of observations for the full sample, 'poor' sample and 'non-poor' sample range between [2934-3075], [747-783] and [2187-2292] respectively. Not reported but included in our specification are village fixed effects and measures of economic status, human capital, social capital, demographics, religion, year and shock dummies. All dependent variables are log-transformed. Clustered standard errors (at Kebele/village level) are reported in parentheses.
Statistical significance: * 10%, ** 5%, *** 1%.