HEALTH SHOCKS, HOUSEHOLD CONSUMPTION, AND CHILD NUTRITION[*]

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ABSTRACT

This paper investigates the effect of health shocks on household consumption and child nutrition. Using longitudinal data from rural Colombia we find that several items of household consumption, including medical expenditure, food consumption, and total consumption, increase following a recent illness event of an adult usually active in the labour market. In contrast to this, we find that girls' weight is negatively affected, as a consequence of the same illness event. The results on nutrition present an interesting gender bias, since we do not find any evidence that boys' nutritional status deteriorates. Our conclusion is that households make difficult intrahousehold choices when an illness shock hit them. The results have implications for the literature on testing for full insurance because it usually relies on household consumption net of medical expenditures as a measure of welfare. This fact shows that this literature might has underestimated the effects of health shocks on welfare.

Keywords: Risk sharing, Child nutrition, Household Consumption, Intrahousehold, Health Shocks.

JEL Classification: C23, C81, D13.

RESUMEN

Este artículo investiga los efectos de los s*hock* de salud sobre el consumo de los hogares y la nutrición infantil. A partir de una base de datos longitudinal que corresponde a datos del área rural de Colombia encontramos que varios elementos del consumo de los hogares, incluidos gastos médicos, consumo de alimentos y consumo total del hogar, aumentan después de que una reciente enfermedad afecte a un adulto del hogar activo en el mercado de trabajo. En contraposición a este resultado, encontramos que la nutrición de los niños se ve negativamente afectada. En concreto el peso de las niñas se reduce tras este *shock* de salud. Este resultado sobre nutrición presenta un interesante sesgo de género, ya que no encontramos evidencia de un deterioro nutricional en los niños. Nuestra conclusión es que los hogares tienen difícil elecciones dentro de los hogares cuando un *shock* de salud les sacude. Este resultado tiene implicaciones para la literatura que prueba la cobertura total de los hogares ya que esta atiende únicamente al consumo de los hogares, neto de los gastos médicos, como medida de bienestar. Este hecho muestra que esta literatura podría estar subestimando los efectos de los *shock* de salud sobre el bienestar de los hogares.

Palabras clave: Riesgo compartido, Nutrición infantil, Consumo del hogar, *Shock* de salud.

1. Introduction

Households in developing countries must rely on informal coping mechanisms (transfers from their relatives or other support networks, borrowing from landowners) or selling their assets to smooth consumption because formal credits and insurance markets do not work well or are absent.[1] An important question is whether these informal coping mechanisms are enough to protect household's welfare against adverse shocks. Most of the literature on risk sharing has focused on household consumption as the key variable to determine whether or not households are fully insured. An unexplored issue in this literature is that the household might want to increase consumption in certain items different from medical care (food, clean fuel, blankets, etc) in order to improve health or to accommodate a sick person at home.[2]

The contribution of this paper is twofold. First, we test for full insurance within the household, and in particular, we test whether children's weight decreases after an older household member suffer a recent illness shock. We find that girl's weight decreases after a male adult has suffered an illness shock. Second, we document that different measures of household consumption, such as medical household consumption, food household consumption, and total consumption net of food consumption and health expenditures, increase after a recent illness of an adult able to be active in the labour market. This is consistent with both households increasing consumption to facilitate that breadwinners recover as fast as possible and with extra costs associated with taking care of an ill person in the household.

Our findings have implications for the literature on risk sharing and consumption smoothing which concludes that household welfare is fully insured if household consumption remains constant after an income shock. According to our results, different items of household consumption can increase but still some household members are worse off after the illness shock. Important reallocation of non medical consumption across different items and different household members is consistent with non medical

[1] See Townsend (1994) and Udry (1994) for early work that find support for at least partial risk sharing among households. See Morduch (1995, 2002) and Townsend (1995) for a review of the literature on insuring consumption.

[2] Wagstaff (2007) finds evidence that households reallocate spending away from food to upgrade their homes to make them suitable for a recently hospitalized member.

care consumption remaining constant after an illness shock. This is because recent illness might trigger an increase not only on medical consumption but also on certain items of non-medical consumption which might need to be financed through a decrease of other items of non-medical consumption.

We use longitudinal data from small towns in Colombia to estimate the effect of recent illness shocks on household consumption and children's anthropometrics.[3] The sample is of a very poor population because it was collected to evaluate a means tested social program called *Familias en Acción*. This is important if the responses to illness shocks are heterogeneous across poverty levels. The longitudinal feature of the data is very important to control for unobserved heterogeneity that might drives both adult illness shocks and consumption or children's weight.

Previous papers have found that health shocks reduce labour supply and/or earned income in several countries of Africa and Asia (Pitt and Rosenzweig 1986, Schultz and Tansel 1997, Gertler and Gruber 2002, Lindelow and Wagstaff 2005, Wagstaff 2007). The fact of whether or not households can smooth health shocks is more controversial. Towsend (1995) finds that the percentage of the year that a male adult is sick has no impact on consumption, and concludes that households seem to be well insured thanks to informal mechanisms. On the contrary, Gertler and Gruber (2002) find that non-medical consumption decreases when households are hit by health shocks. Their results are not in inconsistent with ours. An important difference between Gertler and Gruber's paper and ours is that they focus on very serious but not necessarily recent health shocks, while we study recent health shocks. It can happen that households increase non-medical consumption at the beginning of an illness to speed up the process of health recovery but this cannot be financed in the medium term and hence non-medical consumption ends up decreasing. Wagstaff (2007) also studies serious but not necessarily recent health shocks in Vietnam. He finds that households reallocate spending away from food to upgrade their homes to make them suitable for a recently hospitalized member.

There is already some literature on the intra household consequences of shocks. Dearcon and Krishnan (2000) use data on adult nutrition in Ethiopia to investigate whether individuals are able to smooth their consumption over time and relative to other household members. They find that poor southern households do not pool the illness

[3] The data is publicly available from http://www.dnp.gov.co/paginas_detalle.aspx?idp=760

shocks to women. Beegle *et al* (2006) estimates the consequences of crop loss on child labour, and Fitzsimons and Mesnard (2007) estimate the consequences of death or divorce of the household head on children schooling. Contrary to these papers, we focus on children's nutritional status that has been related to later education attainment (Behrman 1996; Strauss and Thomas 1995; Alderman el al. (2001)) and productivity later in life (Dasgupta 1993; Strauss and Thomas 1998; Schultz 1999; Maluccio et al. (2006)). Our paper is also related to the literature on gender bias. Behrman and Deolakiar (1990) find that price elasticity of food is higher for females than for males, suggesting that girls' nutritional status is likely to deteriorate more than boys' nutritional status when food price increases. We find a similar gender bias pattern for the effect of illness shocks.

The remainder of the paper is organized as follows. Section 2 presents the dataset used. Section 3 and 4 present the econometric specification and the main results on household consumption and the different sources of income used to finance the increase in household consumption. Section 5 shows the model used and the main results for the analysis of children's nutritional status. We present in all sections some additional regressions to give more robustness to our conclusions. Section 6 concludes.

2. The data

The data used in this paper come from the evaluation of *Familias en Acción*, a program implemented by the Colombian government to foster human capital accumulation among poor children living in small rural municipalities. The program, modelled after the Mexican *PROGRESA*, provides monetary transfers to mothers in beneficiary families, conditional on having completed some requirements. We use this dataset because it is an unusual large longitudinal dataset of population living in rural villages that contains information about adversities, detailed information about household consumption, and children anthropometric measures of nutrition. Detailed information about the data can be found in Attanasio (2003).

The sample consists of 122 municipalities, 57 treatment municipalities were targeted by the program as of December 2002 and 65 municipalities were chosen as

comparison municipalities.[4] Qualified municipalities for the program had less than 100.000 inhabitants, a bank that will be used to transfer the money safely, and enough education and health infrastructures. The treatment municipalities included in the sample were chosen randomly within each of 25 strata. The comparison municipalities were chosen as the most similar to the treatment municipalities among those that did not qualify for the program. Proximity was assessed in terms of population size, percentage of population living in the urban part of the municipality, index of quality of life, and an index measured built using information on health and education infrastructures. In practice, most of the comparison towns satisfy most of the conditions imposed by the program with the exception of the presence of a bank.

Three waves of data have been collected on the same households, the first wave started in the summer of 2002, the second between July and November 2003, and the third between December 2005 and March 2006. Attrition rates were reasonably low (6% between the first and second wave and an additional 10% in the third wave). In the first wave, 11502 households were interviewed. All interviewed households had children below 17.

Household consumption and child anthropometric are key variables for our analysis. Anthropometric measurements (height and weight) are crucial to analyse child nutritional status. These variables were collected for children below 7 years old in the first wave, below 8 years old in the second wave, and below 10 years old in the third wave. Therefore, our sample is restricted to those households that have children between 0 and 6 years old, because is the group for which the survey gathers information about nutrition.

The information about household consumption in the survey includes consumption of 98 different food items, independently of whether they were purchased, obtained as a gift, obtained as a payment in kind, or they come from their own farm. It also includes information on 51 non-food items such as fuel, transportation, hygienic and cleaning products, clothes and shoes, durables, and medical expenses. In our analysis, we use five different measures of household consumption: Total consumption, food consumption, medical expenditure, others expenditures that exclude those on food or health, and household consumption not related with health. This last category incorporate consumption that are not likely to be part of the health production function,

[4] 13 municipalities that were originally part of the comparison group became treated between November 2003 and December 2005.

such as money given to children to be spent at school, newspapers, personal services (hairdressers, beauticians, etc.), leisure (cinema, night clubs, trips, etc.), clothes and shoes, books, music, and toys. Consequently, this category of household consumption is introduced as a falsification exercise to check our empirical strategy, since we do not expect to find an increase in these items.

Our purpose in this paper is to analyse the households' response in terms of consumption and nutrition to health shocks that could hit the household. Relating with consumption, our purpose is to analyse if the household is able to increase consumption in order to recover the health of a breadwinner. If that, it would imply an extra effort for the household's wealth that could damage the welfare of the household. We measure changes in household welfare by analysing changes in the nutrition of the youngest household members, whose nutrition status is likely to deteriorate more rapidly.

As in Gertler and Gruber (2002), the health measure in our analysis is the individual's ability to perform activities of daily living (*ADLs*)[5]. However, we do not have in the survey self-reported illnesses symptoms to construct this health measure. Therefore, we consider from the survey a question that give us exactly if the individual has had any illnesses that does not let her perform activity of daily living.

Although the survey allows to use a different periodicity in the definition of the health shocks, since it reports information for more than one month hospitalization episodes and for illnesses periods occurred during the last previous one year and a half, in this paper, we decide to analyse recent illness episodes, in contrast to previous author (Gertler and Gruber 2002) who consider more than one month chronically illness. We focus on recent illness shocks, the last fifteen days, because it is for them that household consumption might reacts in order to help the individual to recuperate their health or because the extra time that the ill person stays at home. Moreover, also in the short-run, this health shock could hit other household group's nutrition, as a consequence of the resources that are being given to the ill person.

Consequently, the questions of the survey from which we construct the health shock variable tells us whether the individual have had any health problem during the last fifteen days that does not let her perform activities of daily living.

[5] ADLs have been used in a number of studies of the relationship between health and the labour market outcomes. See Bound (1991) for a review of the developing country application.

We define our health shocks separately for male and female, and three different working age groups –12 to 17, 18 to 65, and older than 65 years old-. The objective of making this age and gender division is to consider different working age groups which are supposed to have a different income contribution to the household, and therefore, they could affect household consumption and income in a different way. Moreover, we only consider health shocks that hit individuals who are likely to be active in the labour market.[6] We consider this group instead of individuals currently active in the labour market because we want to consider illness episodes of whatever household member older than 12 able to report any income to the household, independently of the timing and periodicity of their usual job[7]. Therefore, we are analysing the household's response of having an individual able to be active in the labour market, unable to do her daily activity because of illness in the fifteen days previous to the interview.

Tables 1 shows the independent and outcome variables included in our specifications, as well as the descriptive statistics.

3. Household consumption response to health shocks

In order to investigate how recent illness shocks affect household consumption, we estimate the following model:

$$C_{ht} = \alpha\ D_{ht} + \beta\ X_{ht} + \lambda_h + \varepsilon_{ht}\ , \qquad t = 1,\ 2,\ 3 \qquad (1)$$

The regression includes C_{ht} which refers to household consumption of the h^{th} household in wave t; D_{ht} that is a binary variable that takes value 1 if any member of the h^{th} household has suffered a health shock during the last fifteen days and she has worked in a remunerable job at least once in her live, and 0 otherwise; and the following time varying household characteristics X_{ht}: household composition by age and gender, age of the household head, a dummy variable that takes into account whether the

[6] Illness shock variable is equal 1 if the individual was ill during the previous fifteen days and she has worked in a remunerable job at least once in her live.

[7] We are considering mainly agricultural economies in which the seasonality of their jobs is high. Moreover, although the estimations are not reported in the paper, we proof that our health shock produces a significant decline in the labour supply of the sick person.

Table 1: Descriptive statistics

Variable	Observation	Mean	Std. Dev.	Min	Max
Control variables					
t2003	41196	0.3333	0.4714	0	1
t2005	41196	0.3333	0.4714	0	1
FA_normal	41196	0.5027	0.4999	0	1
FA_late	41196	0.0288	0.1673	0	1
eligible	35191	0.9152	0.2785	0	1
eligible*FA_normal	35191	0.4412	0.4965	0	1
eligible*FA_late	35191	0.0265	0.1606	0	1
Female	32133	0.4834	0.4997	0	1
Age in month	32115	59.676	29.253	0	139.13
Age in month^2	32115	44.170	35.598	0	193.59
Age in month^3	32115	36.400	39.698	0	269.36
Two years	41196	0.8908	0.3118	0	1
Age in month*female	32114	28.736	36.080	0	120.25
Age in month^2*female	32114	21.277	33.208	0	144.59
Age in month*two years	32115	57.873	32.216	0	139.14
Age in month^2*two years	32115	43.871	35.951	0	193.59
Age in month*female*two years	32114	27.852	36.571	0	120.25
Age in month^2*female*two years	32114	21.132	33.293	0	144.59
Rural part of the municipality	32229	0.5465	0.4978	0	1
Height of the mother (in metres)	28601	1.5380	0.0609	1.307	1.782
One-parental household	32171	0.1561	0.3629	0	1
Order of the child	32208	3.4465	1.7309	1	16
Order of the child^2	32208	14.875	15.264	1	256
Number of male adults	36930	1.2807	0.8559	0	9
Number of female adults	36930	1.3855	0.7525	0	10
Number of boys older than 12	36930	0.4699	0.7324	0	6
Number of girls older than 12	36930	0.4077	0.6627	0	5
Number of boys between 6 and 11	36930	0.8302	0.8596	0	5
Number of girls between 6 and 11	36930	0.7784	0.8268	0	5
Number of boys between 0 and 5	36930	0.7994	0.8483	0	7
Number of girls between 0 and 5	36930	0.7556	0.8290	0	6
Household head's age	32123	0.4168	0.1223	0.15	0.96
Household head's age^2	32123	0.1887	0.1175	0.023	0.921
Mother's age	29424	0.3240	0.0707	0.15	0.57
Mother's age^2	29424	0.1099	0.0482	0.023	0.325
Household head's level of education (level 2)	31552	0.4448	0.4970	0	1
Household head's level of education (level 3)	31552	0.1770	0.3817	0	1
Household head's level of education (level 4)	31552	0.1060	0.3078	0	1
Household head's level of education (level 5)	31552	0.0413	0.1222	0	1
Mother's level of education (level 2)	28980	0.4460	0.4971	0	1
Mother's level of education (level 3)	28980	0.2106	0.4077	0	1
Mother's level of education (level 4)	28980	0.1391	0.3461	0	1
Mother's level of education (level 5)	28980	0.0591	0.2357	0	1
Survey month's realisation - January	32134	0.0459	0.2093	0	1
Survey month's realisation - Febr	32134	0.0913	0.2881	0	1
Survey month's realisation - March	32134	0.0911	0.2877	0	1
Survey month's realisation - April	32134	0.0055	0.0742	0	1

Table 1 (continuation): Descriptive statistics

Variable	Observation	Mean	Std. Dev.	Min	Max
Control variables (continuation)					
Survey month's realisation - June	32134	0.0045	0.0672	0	1
Survey month's realisation - July	32134	0.1225	0.3279	0	1
Survey month's realisation - Septem	32134	0.1872	0.3901	0	1
Survey month's realisation - Octob	32134	0.1363	0.3431	0	1
Survey month's realisation - Novem	32134	0.0707	0.2564	0	1
Survey month's realisation - Decem	32134	0.0457	0.2090	0	1
Health shock: Man age 12 to 17	36845	0.0202	0.1407	0	1
Health shock: Man age 18 to 65	35559	0.1871	0.3900	0	1
Health shock: Man older than 65	36655	0.0186	0.1350	0	1
Health shock: Woman age 12 to 17	19568	0.0091	0.0952	0	1
Health shock: Woman age 18 to 65	19181	0.1845	0.3879	0	1
Health shock: Woman older than 65	19564	0.0132	0.1141	0	1
Other shock: Death of any member	19591	0.0347	0.1830	0	1
Other shock: Family business lost	19533	0.1778	0.3823	0	1
Other shock: Past loss of crop	19581	0.0138	0.1168	0	1
Other shock: Natural catastrophe	19573	0.0322	0.1765	0	1
Other shocks: Violence or forced displacement	19572	0.0199	0.1397	0	1
Nutritional variables					
Height for age	28811	-1.2003	1.0794	-5.93	5.36
Weight for height	28811	0.0161	0.9281	-3.93	5.96
Consumption variables					
Total consumption	19584	201.60	111.63	3.467	1645.4
Total food consumption	19605	122.54	72.850	0	1337.3
Total consumption net of food consumption and health expenditures	19582	74.119	58.814	1.977	1607.4
Total consumption related with health	19603	4.8386	13.4347	0	705.04
Consumption of items not related with health (leisure, clothes, etc.)	19578	9071.75	117373.1	0	$1.00e^{07}$
Labour supply variables					
Minutes worked	80521	135.192	227.129	0	1080
Worked in any activities	80412	0.3583	0.4795	0	1
Worked more than one hour	80521	0.3614	0.4804	0	1
Other sources of income					
Transferences	19603	0.5477	0.4977	0	1
Debts	19603	0.7266	0.4457	0	1
Saving	19603	0.0358	0.1859	0	1

household lives in the urban or rural part of the municipality, and some dummy variables related to the eligibility of households and municipalities to be part of *Familias en Acción.*

We define five eligibility variables. Two of these variables are dummies and they are related with the eligibility of the municipality to be part of the *Familias en Acción*. Concretely, these variables tell us the moment in which the municipality enters in the program: The first variable called F*A_normal* takes the value 1 if the municipality entered to be part of the program in the baseline year (summer of 2002) or in the next wave (third and fourth quarter of 2003). The other dummy, called F*A_late*, indicates whether the municipality enters in the last wave, December of 2005 and first quarter of 2006. Another variable, that is called eligible, captures the fact that a family could be selected to be part of the program. A household could enter in *Familias en Acción* if it has at least one child younger than 6 year old. New births are not considered and, moreover, if the child becomes older than 6 the household will be send down of the program. In that way, the variable is equal to 1 if in the first wave the household has any child younger than 6, the variable takes the value 2 if in the second wave the age of the child is between 1 and 6 years old, and the variable is equal to 3 if in the third wave (year 2005) the age of the child is between 3 and 6 years old. The other two variables left are the interaction between the municipality variables, F*A_late* and F*A_normal*, with the eligible variable. These interactions tell us if we are considering an eligible household of a municipality that is part of *Familias en Acción.*

We also control for the time in which the information of the survey was collected. Two annual dummy variables indicate whether the data belong to the second or third wave. Ten monthly dummy variables indicate the month in which the survey was fulfilled. This monthly variables are important since we are considering agricultural economics for which the level of household income and consumption will depend in the month we gather the information. The reference month is August, in which the number of surveys done reaches the maximum. May is also dropped because there are no information for this month.

The household fixed effects λ_h controls that poorer households might be more prone to receive shocks, and they will have worse levels of the outcome variable independently of the shock occurring or not (see Gertler and Gruber 2002, Beegle *et al.* 2006, Fitzsimons and Mesnard 2007). We also cluster the standard errors at the municipality level, what allows for arbitrary correlation of the random error term ε_{ht} within each municipality (Pepper, 2002). In particular, it also allows for autocorrelation of the time varying part of the error term.

The analysis is performed by using five different categories of *monthly* household consumption: Total consumption, food consumption, medical expenditure, total consumption net of food consumption and health expenditures[8]. We also include an additional household consumption variable that includes those items not related with health. In this case the data was collected for the last three months[9]. This last category refers to money given to children to be spent at school, newspapers, personal services (hairdressers, beauticians, etc.), leisure (cinema, night clubs, trips, etc.), clothes and shoes, books, music, and toys. Household consumption variables have been expressed in real terms, 2003 prices, and in dollars.

The results for illness shocks suffered by men are reported in the first panel of Table 2. We find that household consumption increases after an illness hits a male in the 18-65 age group. The estimate is significantly different from zero at 1% for total consumption, medical expenditures, and other consumption, while the increase in food consumption is only significant at 10%[10]. For the other two age groups, we do not find significant effects on household consumption. In the lower panel of Table 2, we consider the results for illness shocks suffered by women. In this case, we observe a significant increase for medical expenditure and total consumption net of food consumption and health expenditures at 5% in the 18-65 age group. Lindelow and Wagstaff (2005) also find that negative health shocks are associated with a significant increase in health care expenditures, being the increase smaller for the poorest.

The last column of Table 2 reports the effect that the illness shocks have on goods that are definitely not related to health improvement or accommodating the needs of a sick individual at home. As expected, we find that the consumption of these goods do not increase for any of the shocks but it does not significantly decrease, as we would probably have expected.

The results are robust to a number of alternative specifications. Table 3 to 5 incorporate the education level of the current head, dummy of one-parental household,

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[8] The last category tries to consider the household variable being exogenous.

[9] As in the case of the monthly variables the timing differs from the timing of the health shock variables, which is fifteen days. This fact is not relevant for our estimations since the fact of including the last one or three months also implies to consider what happen during the last fifteen days. This fact just will probably require having a biggest sample size, and we consider ours is big enough (around 19600 observations in the total panel).

[10] We would dismiss the increase on food expending since they are not significant ($p>0.05$) and they are very different for men and women for the case of the 18-65 age group which have no sense.

and mother's education level, respectively. These additional specifications support the main conclusion: that household consumption increases when a recent illness shock hits a member of the household in the 18 to 65 age group who able to be part of the labour market and therefore to report any income to the household.

Table 2: Effect of an adult's illness on Household Consumption

	Total Consumption	Food Consumption	Medical expenditure	Other consumption	No related with health
Male					
Age 12 to 17	8.668	2.015	-0.743	7.328	1.974
	[8.224]	[5.279]	[1.147]	[4.444]	[4.406]
Age 18 to 65	9.646***	4.456*	1.429***	3.874**	-0.431
	[3.314]	[2.285]	[0.472]	[1.728]	[0.619]
Older than 65	3.626	6.110	2.235	-4.709	0.040
	[9.758]	[7.281]	[1.431]	[4.420]	[2.542]
Female					
Age 12 to 17	-10.491	-4.458	-0.741	-5.281	1.759
	[11.873]	[7.521]	[1.727]	[7.221]	[6.591]
Age 18 to 65	4.378	-0.932	1.424**	3.902**	-1.746
	[3.780]	[2.490]	[0.635]	[1.838]	[1.501]
Older than 65	22.805	15.693	0.037	8.097	-1.481
	[16.780]	[12.002]	[1.888]	[8.428]	[1.720]
Observations	16198	16211	16211	16198	16189
R-squared	0.05	0.05	0.01	0.06	0.01

Note: The column listed by "Other total consumption" refers to household consumption other than food or health. The specification controls for households composition by age and gender, whether the households lives in a municipality where the program *Familias en Acción* is active, time dummies, age of the household head, whether the household is in a rural area. Robust standard errors in brackets, clustered at municipality level. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 3: Effect of an adult's illness on Household Consumption

	Total Consumption	Food Consumption	Medical expenditure	Other consumption	No related with health
Male					
Age 12 to 17	8.637	2.162	-0.809	7.213	2.048
	[8.237]	[5.278]	[1.155]	[4.452]	[4.431]
Age 18 to 65	9.383***	4.220*	1.441***	3.835**	-0.386
	[3.389]	[2.336]	[0.471]	[1.739]	[0.639]
Older than 65	3.929	5.864	2.188	-4.115	-0.273
	[9.817]	[7.320]	[1.452]	[4.643]	[2.683]
Female					
Age 12 to 17	-10.144	-4.440	-0.720	-4.972	1.781
	[11.748]	[7.464]	[1.745]	[7.165]	[6.623]
Age 18 to 65	4.376	-0.911	1.397**	3.906**	-1.784
	[3.822]	[2.507]	[0.641]	[1.859]	[1.507]
Older than 65	21.940	15.739	0.073	7.185	-1.399
	[17.527]	[12.473]	[1.950]	[8.802]	[1.753]
Observations	16014	16027	16027	16014	16005
R-squared	0.05	0.05	0.01	0.06	0.01

Note: The column listed by "Other total consumption" refers to household consumption other than food or health. Education level of the current head of household is add as a control variable to the basic specification. Dummy of preschool level is dropped. Robust standard errors in brackets, clustered at municipality level. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4: Effect of an adult's illness on Household Consumption

	Total Consumption	Food Consumption	Medical expenditure	Other consumption	No related with health
Male					
Age 12 to 17	8.705	2.128	-0.868	7.375	2.057
	[8.291]	[5.314]	[1.160]	[4.461]	[4.451]
Age 18 to 65	9.311**	4.182*	1.431***	3.812**	-0.385
	[3.410]	[2.354]	[0.475]	[1.742]	[0.635]
Older than 65	4.131	5.961	2.187	-4.008	-0.274
	[9.778]	[7.323]	[1.460]	[4.616]	[2.700]
Female					
Age 12 to 17	-10.081	-4.405	-0.705	-4.961	1.779
	[11.711]	[7.438]	[1.750]	[7.167]	[6.631]
Age 18 to 65	4.468	-0.848	1.396**	3.937**	-1.785
	[3.849]	[2.530]	[0.640]	[1.866]	[1.505]
Older than 65	22.036	15.779	0.092	7.221	-1.401
	[17.530]	[12.465]	[1.955]	[8.799]	[1.777]
Observations	16008	16021	16021	16008	15999
R-squared	0.05	0.05	0.01	0.06	0.01

Note: The column listed by "Other total consumption" refers to household expenditures other than food or health. Here we add the dummy of whether the household is a one-parent household to the specification of Table 2. Robust standard errors in brackets, clustered at municipality level. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: Effect of an adult's illness on Household Consumption

	Total Consumption	Food Consumption	Medical expenditure	Other consumption	No related with health
Male					
Age 12 to 17	7.442	2.317	-0.999	6.103	-1.044
	[8.482]	[5.648]	[1.247]	[4.350]	[2.184]
Age 18 to 65	9.556**	4.199	1.360**	4.006*	-0.367
	[3.587]	[2.437]	[0.476]	[1.832]	[0.680]
Older than 65	3.163	4.478	2.585	-3.899	0.284
	[10.466]	[7.965]	[1.730]	[5.237]	[2.935]
Female					
Age 12 to 17	-6.458	-4.553	-1.372	-0.573	-3.090
	[12.450]	[8.261]	[1.963]	[7.222]	[3.701]
Age 18 to 65	4.439	-0.947	1.463*	3.999*	-1.261
	[3.903]	[2.507]	[0.692]	[1.907]	[1.511]
Older than 65	30.593	25.728	-0.181	5.027	0.175
	[18.370]	[15.326]	[2.404]	[5.547]	[0.807]
Observations	14375	14385	14385	14375	14366
R-squared	0.05	0.05	0.01	0.07	0.01

Note: The column listed by "Other total consumption" refers to household expenditures other than food or health. Here we add the wife's education level to the specification used in Table 3. We drop the dummy of preschooler level. Robust standard errors in brackets, clustered at municipality level. * significant at 10%; ** significant at 5%; *** significant at 1%.

3.1 Households' consumption response to different types of shocks.

We claim that household consumption increases following an illness shock because the household wants to speed up the improvement in health of the sick person, and because of accommodating the needs of caring for this person at home. As a

consequence, we would not expect to find that household consumption increases after a non-health related shock. To test this hypothesis, we include in our household consumption regression four dummy variables representing other shocks different from health shocks such as, past loss of crop, loss of family business, natural catastrophes, and other shocks (violence, forced displacements, etc.), from which we do not expect to find any increase in any item of the health production function and, consequently, not an increase on household consumption.

We estimate the following equation:

$$C_{ht} = \alpha\ D_{ht} + Shocks'\phi + \beta\ X_{ht} + \lambda_h + \varepsilon_{ht}\ , \quad t = 1,\ 2,\ 3 \qquad (2)$$

This regression incorporate to the previous specification (1) a vector of dummy variables, called Shocks, that includes five different types of shocks hitting the households during the previous two years. The result of this analysis is presented in Table 7. We observe that only those shocks related with health caused a significant increase in household consumption, as we concluded from Table 2 to 5.

Respect to the five adversities hitting the household, i.e. *shocks* dummy variables included in (2), we observed that only the fact of having a death in the household produces a significant increase in the last column of the Table 6 (Other consumption), which might be related with funeral expenses. But neither family business or crops lost nor natural catastrophes or other types of shocks produce a significant increase in household consumption, as expected.

4. Sources of income to finance the increases in household consumption

There are some private informal coping mechanisms that households living in developing countries usually rely on to deal with negative income shocks[11], and consequently to smoothing consumption. In this section, following Townsend (1995), we study some of these informal mechanisms for the case of health shocks.

[11] Although results are not reported in the paper, it have been proof that we are dealing with a negative income shock since the health shock produces a significant decline in the labour supply of the sick person. This result had been obtained by previous author working on the effect of health shocks on the labour market, such as Gertler and Gruber (2002), Lindelow and Wagstaff (2005), Wagstaff (2007).

Table 6: Effect of different shocks on Household Consumption

	Total Consumption	Food Consumption	Medical expenditure	Other consumption
Other shocks not related with health				
Death	13.125*	1.057	-1.150	12.872***
	[6.890]	[4.623]	[1.202]	[3.617]
Business lost	3.870	1.729	0.991	1.183
	[3.759]	[2.679]	[0.753]	[1.846]
Crop lost	0.073	-4.000	1.162	2.946
	[10.448]	[6.551]	[1.959]	[5.862]
Catastrophe	8.283	4.464	-0.216	4.298
	[7.819]	[5.259]	[0.816]	[4.524]
Other shocks	11.897	1.772	0.969	8.555
	[8.594]	[5.765]	[1.833]	[5.470]
Illness: Male				
Age 12 to 17	7.910	1.341	-0.715	7.200
	[8.314]	[5.286]	[1.179]	[4.505]
Age 18 to 65	8.800***	4.120*	1.388***	3.475**
	[3.335]	[2.346]	[0.489]	[1.632]
Older than 65	1.386	4.841	1.248	-4.714
	[9.338]	[6.964]	[1.499]	[4.501]
Illness: Female				
Age 12 to 17	-9.886	-3.844	-0.966	-5.046
	[12.288]	[7.815]	[1.783]	[7.436]
Age 18 to 65	4.148	-1.114	1.394**	3.932**
	[3.734]	[2.485]	[0.629]	[1.833]
Older than 65	24.275	16.390	-0.085	7.896
	[16.913]	[12.143]	[1.879]	[8.402]
Observations	16093	16106	16106	16093
R-squared	0.05	0.05	0.01	0.07

Note: The column listed by "Other total consumption" refers to household consumption other than food or health. The specification controls for households composition by age and gender, whether the households lives in a municipality where the program Familias en Acción is active, time dummies, age of the household head, whether the household is in a rural area. Robust standard errors in brackets, clustered at municipality level. * significant at 10%; ** significant at 5%; *** significant at 1%.

4.1. Labour supply of other household members

In the case of health shocks, households could cope with the illnesses episodes by increasing the labour supply of the healthy household members. Whether or not this can be done will depend, among other things, on the labour market and how easy is to substitute one household member by other.

In order to analyse the use of this informal mechanism, we estimate the effect of health shocks on the labour supply of healthy household members by using the following specification:

$$L_{iht} = \alpha\ D_{ht} + \beta\ X_{ht} + \lambda_h + \varepsilon_{iht}\ , \qquad t = 1,\ 2,\ 3 \qquad (3)$$

The dependent variable L_{iht} is the labour supply of healthy household members. We use three different definitions of labour supply. Firstly, we use a continuous variable for the minutes worked the previous working day to the interview. We consider three different jobs: paid job inside the house, outside the house, and unpaid task inside the house. Secondly, we specify a discrete variable to consider whether or not the individual worked during the previous days. We use two alternative definitions. On one hand, we consider whether the individual made any paid or unpaid activities in the week before the interview.[12] On the other hand, the discrete variable is equal one if the individual worked more than one hour on the day before to the interview[13].

The estimation method depends on the way we have defined the dependent variable. We use a linear model with household fixed effects for the continuous labour supply variable, and a conditional logit with household fixed effects for discrete outcomes. In both cases, the standard errors are clustered at the municipality level[14].

The time varying vector of control variables X_{ht} includes: Household composition by age and gender, age, education level and gender of the healthy household member, the age of the household head, and two dummy variables to consider whether the household is a one-parental household, and whether the household lives in the rural or urban area of the municipality. We also consider time and monthly dummy variables indicating the moment in which the information was collected.

The results are presented in Table 7 and 8. We focus on the second age group because this is the one for which we find significant effect on household consumption. We find that the effects of health shocks on the labour supply of other healthy household members are not statistically significant, although they are positive. Moreover, we do not find significant effect for the other two groups. The results hold for men and women, and for the three different measures of labour supply. As we get, previous authors do not find evidence that other household members compensate the

[12] This variable is built by using two different question of the survey. The dummy variable is equal one if the main activity during the last week for this individual was to work, and if the individual developed any remunerable activity during the last week.

[13] We build this variable by using the previous continuous variable of minutes worked. The dummy variable is equal one if the individual worked more than 60 minutes the last working day previous to the interview.

[14] Due to the inefficiency of the conditional logit with fixed effects, we have checked that results hold using a normal linear OLS regression with household fixed effect.

income lost produced by the health shock by increasing their labour supply (Gertler and Grubber 2002, Lindelow and Wagtaff 2005).

Table 7: Labour supply of healthy household members. Continue variable

	Household member age 12 to 17	Household member age 18 to 65	Household member older than 66
Male			
Age 12 to 17	-7.781	10.526	42.337
	[13.936]	[15.366]	[114.136]
Age 18 to 65	4.512	-2.973	13.401
	[5.522]	[4.714]	[40.936]
Older than 65	9.672	1.475	16.846
	[20.502]	[14.835]	[40.187]
Female			
Age 12 to 17	-0.029	-10.984	-64.969
	[22.053]	[20.388]	[139.622]
Age 18 to 65	-2.179	4.036	-0.355
	[6.081]	[6.959]	[30.474]
Older than 65	-18.552	18.714	49.859
	[16.179]	[18.784]	[94.429]
Observations	14739	34403	1409
R-squared	0.11	0.31	0.13

Note: The column listed by "Household member" refers to a healthy individual of the group of age indicated, who lives in the same household that the ill individual. The specification controls for households composition by age and gender, age, gender and education level of the healthy household member, time dummies, age of the household head, two dummy variable to consider whether the household lives in a rural area, or whether the individual lives in a one-parental household. Robust standard errors in brackets, clustered at municipality level.

Table 8a: Labour supply of healthy household members. Discrete variable

	Household member age 12 to 17	Household member age 18 to 65	Household member older than 66
Male			
Age 12 to 17	0.081	0.037	-0.419
	[0.240]	[0.147]	[1.920]
Age 18 to 65	0.001	-0.069	1.012
	[0.116]	[0.061]	[0.762]
Older than 65	0.351	-0.041	-15.800
	[0.377]	[0.180]	[1,648.444]
Female			
Age 12 to 17	0.364	-0.079	0.054
	[0.308]	[0.236]	[2.512]
Age 18 to 65	-0.102	-0.081	0.512
	[0.117]	[0.072]	[0.898]
Older than 65	0.164	0.215	1.883
	[0.538]	[0.226]	[1.607]
Observations	5721	30130	312

Note: The column listed by "Household member" refers to a healthy individual of the group of age indicated, who lives in the same household that the ill individual. The specification controls for households composition by age and gender, age, gender and education level of the healthy household member, time dummies, age of the household head, two dummy variable to consider whether the household lives in a rural area, or whether the individual lives in a one-parental household. Robust standard errors in brackets.

The result that household cannot cope with illness shocks by substituting labour supply gives support to our hypothesis that households will try to improve the health of working age household members after an illness shock so that they can go back to work as soon as possible, and hence they will be willing to increase household consumption if possible to favour that improvement.

Table 8b: Labour supply of healthy household members. Discrete variable

	Household member age 12 to 17	Household member age 18 to 65	Household member older than 66
Male			
Age 12 to 17	-0.347 [0.232]	0.036 [0.133]	1.067 [1.426]
Age 18 to 65	0.123 [0.103]	-0.061 [0.058]	0.999 [0.700]
Older than 65	0.196 [0.325]	0.088 [0.161]	-0.720 [1.096]
Female			
Age 12 to 17	0.260 [0.315]	0.208 [0.211]	10.901 [921.732]
Age 18 to 65	0.013 [0.105]	0.001 [0.059]	0.395 [0.588]
Older than 65	-0.370 [0.432]	0.276 [0.204]	-0.239 [1.235]
Observations	6165	31067	368

Note: See Table 8a for details.

4.2. Net transfer payments, saving, and debts

Given that they cannot increase the labour supply of healthy household members as a response to an illness shock, it must be the case that households are using methods other than labour supply substitution to fund the increase in consumption that takes place after a recent illness event. Following Townsend (1995) we analyse transfer income from their relatives, friends, and/or social support networks, debts i.e. borrowing from local credit market, and savings.

The first possible source of income that we check is whether or not these households received some income from any friend, neighbour, or relative during the

lasttwelve months[15]. We consider three types of transfer payments: monetary, in kind payments, and also labour assistance. Transfer payments are in net terms[16].

The specification used for this analysis is similar to the one used in the analysis of household consumption (1). The dependent variable is now a binary variable equal to one if household has received positive net transfers. The regression is estimated using conditional Logit with household fixed effects and standard errors clustered at the municipality level.

The results for men adults are presented in the upper panel of Table 9. Results from the first column shows transfer payments as one of the possible source of income that households use to deal with male illness episodes, since we find a significant increase on net transfer payments for this group.

Table 9: Informal mechanisms of insurance
(Transfer income, debts, and savings)

	Net transfer payments	Debts	Savings
Male			
Age 12 to 17	0.334*	0.332	0.902
	[0.203]	[0.241]	[0.491]
Age 18 to 65	0.136*	0.106	-0.236
	[0.070]	[0.065]	[0.234]
Older than 65	-0.071	-0.239	0.040
	[0.218]	[0.291]	[0.639]
Female			
Age 12 to 17	0.422	-0.306	-0.139
	[0.297]	[0.332]	[0.805]
Age 18 to 65	-0.056	0.130	-0.125
	[0.072]	[0.076]*	[0.189]
Older than 65	0.249	0.682	-0.124
	[0.293]	[0.423]	[1.346]
Observations	8794	5796	1264

Note: The specification controls for household's composition by age and gender, age, time dummies, age and education level of the household head, two dummy variable to consider whether the household lives in a rural area, or whether the individual lives in a one-parental household. Robust standard errors in brackets. Robust standard errors in brackets, clustered at municipality level. * significant at 10%; ** significant at 5%; *** significant at 1%.

[15] Information of these variables for a different timing is not available in the survey. As we mention before the fact of considering the year before, also imply to consider the information about the last fifteen days. Moreover, the number of observation we have in this case is big enough, (19603 observations).

[16] Net terms means that we are considering the difference between the transfer payments received by the household and the transfer payments given by the household to other households.

The second column shows results for debts. Therefore we are analysing in this case the households' ability of getting into debt when a health shock hit them. The estimated model is specifies as equation (1) but now the dependent variable is a dummy variable indicating if the household has any debts. Estimations are presented in the second column of Table 9. We find that households borrow money when a female between 18 and 65 years old falls ill, since we find a significant effect for this group.

However, although household may also draw on saving to deal with shocks to income (Townsend 1995; Morduch 1995, 2002) this is not the case in our sample. Looking at the last column of Table 9, although we observe declines on household saving for the interest group, results are not significant[17].

We conclude that households can cope with illness shocks by increasing transfer payments or by getting into debt. Table 9 explains how households can afford increases in the consumption of some items following an illness shock of an 18-65 years old individual usually active in the labour market.

5. Effects on children's nutritional status

We have just seen that households can borrow money or receive transfers when hit by an illness shock. We have also seen that household can increase several items of household consumption following an illness shock, probably to speed up the process of health recovery. From this, one cannot conclude that the household is fully insured because it could happen that healthy individuals reduce their consumption so that more resources can de devoted to the sick person that is usually active in the labour market. Below, we find that girls' nutritional status decrease following an illness shock of an 18-65 year old man active in the labour market. This shows that the household is not fully insured although we found an increase in household consumption after an illness shock.

The child nutritional status is defined on the basis of anthropometric indicators: height and/or weight. Our survey data contain measurements of weight and height for

[17] The model in this case is estimated by using a conditional logit household fixed effect and standard errors cluster at the municipality level where the dependent variable is a dummy variable indicating if any household member has savings.

each child of the household that is below 7 years old in the first wave, below 8 years old in the second one, and below 10 years old in the third wave. We use these physical measurements to assess the most commonly used anthropometric indicators for children -*Weight-for-Height*, and *Height-for- Age*. We use these measures to assess changes in the magnitude of malnutrition overtime.

Weight-for-Height provides a measure of short-run changes in nutritional status, and is normally used as an indicator of current nutritional status. As common in the literature, we use the Z-score of weight for height which is computed as the child's weight minus the average children's weight of the same gender and height in the World Health Organization (WHO) reference population, divided by the standard deviation of weight of children of the same gender and height in the WHO reference population.[18]

Height-for-Age measures long-term changes in malnutrition, indicating past or chronic inadequacies nutrition and/or chronic or frequent illness. We use them as a falsification exercise because we do not have expected that child growth will slow in response to an adult's illness shock in the last fifteen days, since height takes much longer to be affected than fifteen days. We use the *Height-for-Age* Z-score that is computed as the child's height minus the average height of children of the same gender and age in the WHO reference population, divided by the standard deviation of height of children of the same gender and age in the WHO reference population.

We estimate the following specification in which we investigate the effects of health shocks on children's nutritional status:

$$N_{iht} = \gamma X_{it} + \alpha D_{ht} + \beta X_{ht} + \lambda_h + \varepsilon_{iht}, \quad t = 1,\ 2,\ 3 \qquad (4)$$

The dependent variable N_{iht} represents either the *Weight-or-Height* or *Height-for-Age* Z-score of the i^{th} child from household h^{th} at time t, and D_{ht} is a binary variable that takes the value 1 if a member of the h^{th} household was ill fifteen days before t and 0 otherwise.

Our basic specification includes, as before, a flexible polynomial function of the child's age and gender X_{it}, annual and monthly dummy variables indicating the

[18] We use the World Health Organization / Center for Disease Control reference population to compute the Z -scores of *Height for Age*, and *Weight for Height* (WHO 1995).

moment in which the survey was fulfilled, and some time varying covariates at the household level X_{ht}: household size and composition by ages and gender, order of the child in the household, the educational level and ages of the current household's head and the child's mother, a dummy variable to consider whether the child is living in one-parental household, a dummy variable indicating whether the child is younger than twenty-four months[19], and five dummy variables related to the program *Familias en Acción* defined as before.

As in previous analysis, the regressions include household fixed effects λ_h. Notice that as Beegle *et al.* (2006), Fitzsimons and Mesnard (2007), the fixed effect is specified at the household level because the illness shock is also specified at the household level. Because we cluster the standard errors at the municipality level, we also allow for autocorrelation in the error term for each child, and for correlation of the error terms of different children of the same household and of different households but the same municipality.

The parameter estimates of equation (4) are reported in Table 10. We find that an illness of a male adult aged 18-65 active in the labour market decreases the Z-score of *Weight-for-Height* in 0.043 for girls. This effect is statistically significant at 95%. For boys, we do not find any statistically significant effect of illness of older household members on their nutritional status, since we do not find that boys' nutritional status deteriorate.

Although we provide the results given by both malnutrition indicators, the expectation would be that changes would be expected for *Weight-for-Height* but not for height. However, we report the results on height (*Height-for-Age* anthropometric measure) as a falsification exercise. We would not have expected to find that an adult's illness shock in the last fifteen days would have decreased a child's height. Should we have found estimates statistically different from zero of how very recent illness shocks affected children height, we would have suspected that time varying unobservable variables might be driving both nutritional status and shocks.

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[19] The relevance of this variable is high since the youngest the child is the highest is the probability of contagious. Although we do not report the result of the representation, we draw a smooth non-parametric representation of the relation that exists between the child's age and the nutrition variables. We find that the nutrition variables decline with the child's age until the age reaches the twenty-four months, and then the relation remains constant.

Table 10: Effect of an adult's illness on Children' nutritional status

	BOYS		GIRLS	
	HAZ	WHZ	HAZ	WHZ
Males				
Age 12 to 17	-0.016	0.035	-0.027	0.003
	[0.066]	[0.059]	[0.046]	[0.061]
Age 18 to 65	-0.026	0.000	0.031	-0.043**
	[0.021]	[0.022]	[0.019]	[0.021]
Older than 65	-0.003	-0.060	-0.050	-0.153*
	[0.067]	[0.103]	[0.071]	[0.083]
Females				
Age 12 to 17	0.003	0.066	0.086	-0.021
	[0.075]	[0.116]	[0.096]	[0.088]
Age 18 to 65	-0.008	-0.036	0.001	-0.022
	[0.021]	[0.029]	[0.022]	[0.026]
Older than 65	0.117	-0.029	-0.112	-0.089
	[0.129]	[0.148]	[0.080]	[0.103]
Observations	12100	12100	11401	11401
R-squared	0.11	0.06	0.12	0.07

Note: Columns labelled by HAZ and WHZ refers to Z-Score anthropometric measures of Height-for-Age and Weight-for-Height, respectively. Base case controlled for time dummies, polynomial of the child's gender and age, household size and composition by ages and gender, order of the child in the household, a dummy variable to consider whether the child is living in one-parent household, and four dummy variables to consider whether the households lives in a municipality where the *Familias en Acción* program is implemented, as well as whether the child is eligible for the *Familias en Acción* program. Robust standard errors in brackets, clustered at municipality level. * significant at 10%; ** significant at 5%; *** significant at 1%

We present in Table 11 and 12 some additional specifications which include the height of the mother, and a dummy variable of whether the household is in a rural area, respectively. These additional specifications corroborate the robustness of the main conclusion: We find that girls' weight deteriorates when male adults older than 18 years old who are active in the labour market suffer an illness shock. We also find that these health shocks do not affect boys' nutritional status. Results are not significant when women suffer the illness shock.

We believe that girl's nutritional status deteriorate after the illness shock because households subtract resources from the family economy to speed up or to accommodate the adults who are active in the labour market. This subtraction of resources deteriorates the girls' nutritional status which is likely to deteriorate more than boys' nutritional status (Behrman and Deolakiar, 1990). An alternative interpretation is that the decrease in girls' weight is due to biological contagion of disease from adults to children rather than reallocation of resources. However, if the contagion hypothesis was true, we would expect to find the same decrease in weight for boys, which we do not. Moreover, we do not find an effect of shocks suffered by 12-17 on either small girls' or small boys' weight which also makes more difficult to believe in the contagion hypothesis, because

one would think that illnesses are more easily transmitted among closer age groups. As a consequence, we find difficult to argue that the mechanism at play is biological transmission (contagion). In contrast, we think that when adult falls ill, resources are targeted towards the ill adult, which implies that the child health deteriorate, concretely they lose weight.

Table 11: Effect of an adult's illness on Children' nutritional status

	BOYS		GIRLS	
	HAZ	WHZ	HAZ	WHZ
Males				
Age 12 to 17	-0.017	0.036	-0.027	0.003
	[0.066]	[0.059]	[0.046]	[0.061]
Age 18 to 65	-0.026	0.000	0.031	-0.043**
	[0.021]	[0.022]	[0.019]	[0.021]
Older than 65	-0.003	-0.060	-0.051	-0.153*
	[0.067]	[0.103]	[0.071]	[0.083]
Females				
Age 12 to 17	0.004	0.066	0.087	-0.029
	[0.075]	[0.116]	[0.098]	[0.089]
Age 18 to 65	-0.007	-0.036	0.001	-0.022
	[0.021]	[0.029]	[0.022]	[0.026]
Older than 65	0.116	-0.029	-0.113	-0.089
	[0.129]	[0.148]	[0.080]	[0.103]
Observations	12100	12100	11399	11399
R-squared	0.11	0.06	0.12	0.07

Note: We add a dummy variable to consider if the household is in a rural area to the Base case.
See Table 5 for more information about the specification. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 12: Effect of an adult's illness on Children' nutritional status

	BOYS		GIRLS	
	HAZ	WHZ	HAZ	WHZ
Males				
Age 12 to 17	-0.008	0.036	-0.028	0.005
	[0.066]	[0.060]	[0.046]	[0.062]
Age 18 to 65	-0.029	-0.002	0.031	-0.045**
	[0.020]	[0.023]	[0.020]	[0.021]
Older than 65	-0.017	-0.074	-0.032	-0.164*
	[0.070]	[0.108]	[0.073]	[0.087]
Females				
Age 12 to 17	0.006	0.068	0.087	-0.029
	[0.077]	[0.118]	[0.098]	[0.089]
Age 18 to 65	-0.009	-0.034	0.002	-0.024
	[0.021]	[0.029]	[0.021]	[0.026]
Older than 65	0.081	-0.016	-0.128	-0.092
	[0.131]	[0.156]	[0.086]	[0.106]
Observations	11893	11893	11263	11263
R-squared	0.11	0.06	0.12	0.08

Note: We add to previous specification the height of the child's mother. See Table 5 for more information about the specification. * significant at 10%; ** significant at 5%; *** significant at 1%

6. Conclusion

This paper investigates the household's response to health shocks suffered by household members that are usually active in the labour market. Our result shows that household consumption increase following a recent illness event. We believe that this increase in several items of household consumption is because either the household want to speed up the process of health recovery and/or because of extra expenses associated with accommodating the needs of a sick individual at home. Consequently, the consumption of some items in the household, such as health care, fuel, transportation, etc., increase.

This increase in household consumption can only be confined with those items that can be considered as input into the health production function and, consequently, are used to recover the health of the working age household members. To this respect we do not find an increase in those items related with leisure or personal expenses, as well as we do not observe other shocks different from health shocks affecting consumption of the household, which support our hypothesis.

This increase in consumption relies on debts when it is produced an illness episode affecting females, and on transfers from friend and relatives when household is affected by a male illnesses episode.

We also find that health shocks are detrimental to girls' nutritional status. This result gives us support on the hypothesis that, although household consumption is not negatively affected by health shocks, households are not fully insured, since there are some household groups which lose due to the same health shock. This has implications for the literature that tests for full insurance using household consumption net of medical costs. In practice, it means that they could misleadingly conclude that the household is fully insured with it is not.

Our conclusion is that households make difficult intrahousehold choices when health shocks hit them. As a consequence, they increase household consumption to speed up the process of health recovery of the ill household member, but decrease the resources given to other household members and, consequently, girls' nutrition deteriorates which is a proxy of the welfare loss that the household is suffering. Accordingly, if we rely only on using household consumption to analyse how well insured households are, then, the presence of full insurance could be overestimated.

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