SHOCKS

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CENTER FOR GLOBAL DEVELOPMENT + SUSTAINABILITY
GLOBALIZATION AND INDIGENOUS COMMUNITIES
WORKING PAPER 2021-02

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DRAFT: 6/1/2021
Chapter 11

Shocks

Summary: *Aims*: *[a]* To identify harmful shocks adults had the past year and assess the frequency of bedridden days afflicting them the past week, *[b]* identify how adults managed shocks, *[c]* estimate the shocks' financial and psychological costs, and *[d]* assess trends of *[a]-[c]*. I equate psychological costs with negative feeling (e.g., anger) the past week and mirth in the interview. *Methods*: Descriptive yearly statistics (2002-12) were used to assess levels and regressions to estimate trends. *Data*: The core data comes from surveys of the panel study (2002-10), enlarged with the baseline (2008) of the randomized-controlled trial (RCT) on village inequality and an RCT on savings (2011-12). *Findings*: *1] Shocks*: 67% reported no shocks the past year; 77% had not been bedridden the past week. The most usual shocks the past year were illness and deaths (62% of shocks), followed by crop loss (9%), theft and floods (6% each). *2] Cope*: Of those who had a shock, 32% did nothing, 36% coped alone; for other shocks, villagers used social networks (20%), institutions (20%; e.g., government aid), and markets (13%; e.g., sale). Informal transfers of gifts, labor help, credit, and cash donations the past week were rare: 15% got gifts, 6% credit, 4% and 1% received labor help or donations. Bedridden people were more likely to receive gifts and credit, but no informal transfer abated negative feelings. *3] Costs*. The cost/shock the past year was small ($0.02-$0.05 *per capita/*day), but the value of a transfer was not ($2-$7). Bedridden people the past week lost ~2-3 days of work that week, a large imputed income loss. Health shocks had psychological costs; bedridden adults were 5.4% more likely to have negative emotions. *4] Trends*. Life was simultaneously getting better and worse. The chances of having a shock and the number of shocks declined yearly by 5.6 percentage points (PP) and 4.9%; the chances of doing something about a shock (even if alone) rose by 2.3%/year. The number of days in bed and ailments declined by 3% and 2%/year. The chances of experiencing negative emotions shrank by 3.2 PP/year. However, some outcomes worsened. The chances of having had a serious illness the past year (not the past week) rose by 4.4 PP/year while the chances of getting gifts or labor help shrank by 1.5 and 0.5 PP/year. Tsimane' don't fit the stereotype of a vulnerable rural society. They have a penchant for self-reliance and modest sociality (both buttressed by opportune aid from outside institutions during natural disasters), but will join the market economy to get cash to ride out selected misfortunes. Self-insurance via gifts, donations, informal credit, or labor aid didn't help the sick feel happier, hinting that traditional forms of sociality don't fully shield the psyche from mishaps.

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Mishaps strike refractory hinterlanders, and when they do one wonders what the afflicted do to palliate their plight. Do they tighten cinctures, steal, emigrate, or hie to kin for help? We don't know what Tsimane' do when bad luck catches them unawares, but we know the reprise of misfortunes taking many shapes racks them, sometimes randomly, sometimes seasonally, some collisions villagers see coming, some they don't. The two topics — harm and what people do to brace themselves at misfortune — matter for they point to vulnerability and welfare, scars and protection, savings and hock, sharing and redistribution, regret and foreboding, myopia and clairvoyance. We want to know not merely about mishaps begirding the unlucky, but about how the unlucky abate shocks, and whether any of this matters for their psyche. In the penumbra of the market economy, unassimilable people cannot complain much about bad luck because they have a small audience listening to them. They turn stoic until the market economy arrives, giving them new ways of coping, grizzling, and venting maledictions. In affluence, a small symptom puts a person in bed; in remote leafy rural settlements, the same person limps to work with fever.

We have good warrant to think small rural societies, historically lodged far from cities, would have built safety buttresses to help their unfortunate brethren. Anthropology textbooks bristle with examples of sharing, redistribution, pitching in, exchanges, munificence, and reciprocity in non-industrial societies. I expect, more or less, to find the same among Tsimane'. Ethnographies often veer to portraying how and who you help, whether you give meat or root crops, whether you help blood or fictive kin, whether aid goes to co-ethnics or to strangers. I care less about these topics and more about what the unfortunate do with unpleasant happenings. You can enmesh yourself in sociability — visiting each other often, providing one another with treats, gossiping about others to cement the borders of the ingroup — but these gestures don't mean that when one is in distress neighbors will come to help. Day-to-day neighborliness and phatic communion don't bespeak helping hands will cooker one when one needs them most to scotch suffering.

The chapter has three aims, which, together, speak to what adults out of the swim of government do to handle mishaps and adversities. First, I give a fastidious account of the misfortunes adults acknowledged having had the past year, and, for each misfortune, I say what they did. In Malinowskian fashion, I want to find out, and give a circumstantial account, of the painful shocks villagers experienced, well realizing we outsiders might see shocks where they see none. Perhaps villagers got inured to having floods, pests, and diseases wreck some of their crops every year, to losing apparel left out drying in the sun, to losing unpenned poultry to predators, or perhaps they got used to going about their business with a back pain that would not go away. When asked about mishaps, villagers might have undercounted these event. Instead, the approach we followed to assay misadventures turns up exemplary distressing, unforgettable idiopathic events during the past year, like losing a dugout canoe that took weeks to carve out, or a death in the family. Villagers might forget about having been choused out of a cutlass, but they won't forget a death in the family or losing a cow. Second, I scrutinize shocks by shrinking the recall period to the past seven days instead of the past year, and by asking adults about how many days they had been struck with ailments or confined to bed, leaving it up to the sick, convalescent, and malingerer to define ailments, symptoms, and a bedridden day. This time we didn't ask them what they did about the illness, like we did when querying them about how they had bucked adversities the past year[i]. Instead, I tie self-perceived morbidity the past week with the following outcomes, most of them also measured for the past week:

i)   Gifts of goods received

ii)   Labor help received
iii)   Cash credit received (in the past week and the past year)
iv)   Gifts of cash received (in the past two months)
v)   Drinking store-bough alcoholic beverages (beer, ardent spirits)
vi)   Negative feelings (anger, fear, sadness, unhappiness).

The approach allows me to assess, first, if sickness triggers aid (*i-iv*) and if it affects the psyche (*v-vi*) and, second, if aid lessens the psychological burden of sickness. I want to know if aid comes and protects the soul of the sick, or if psychological wounds remain open from inanition, social froideur, and the carnage of traditional safety cushions. For all these topics ─ yearly misadventures of any form and, for the past week, illness, bad feelings, drinking, and aid inflows ─ I want to see how they changed during the study.

To tighten the analysis, I confine the chapter to misadventures and coping, leaving aside whether coping verily protected some of the things one ultimately cares about, like life expectancy, income, assets, or diet. The information we have, though rare, is too noisy to tie causally adversity, what villagers did about adversity, and changes in worthy final outcomes. More prehensible minds with better data, calescent motivation, and finer skills can do that. One exception: I connect bedridden days during the past week with contemporaneous negative feelings because of the overlaps between physical and mental health, between illness and anhedonia. Illness and the soul move together, one dragging the other. The ill and convalescent in bed should be more bobbish and moxie if they get help, I would think.

The choice of using days in bed as a shock to see if it unfurls help from those beyond the family to the sick is apt because among Tsimane' illness is a quasi-public event[ii]. Most every adult knew when someone else in the village got sick. Whether the sick was a woman or a man, whether they lived near one's home or in the outskirts of the village did not matter; most everyone knew when someone outside the family was sick, egroting or not. In contrast, far fewer knew if someone had gone hunting or was bathing in the river. The visibility of illness sent a limpid message to the community of who needed assistance; the message put the burden of providing help on bystanders.

What I expect to find I cannot say. Other chapters have taught Tsimane' aren't diversity fiends. They clear one plot of forest to farm each year, plant a handful of crops, have paltry home gardens (Chapter 6). When they hunt they bring back hardly any animals and when they fish they come back with few species (Chapter 10). At meals they eat plantains and fish, period (Chapter 10, Table 10.4B). The tropics' heat, downpours, pests, and humidity dampen hopes of squirreling away food, leaving households with an empty larder for lean times. These scattered empirical traces say that big bad things will likely leaden Tsimane' with suffering. Comprehensive and wide ranging, the chapter should make clear, by the end, the shocks and guard rails that go up in hard times.

Data: General

In Table 11.1 I indicate the outcomes of the chapter and, for each outcome, I show the core and supplementary datasets used to analyze the outcome. The yearly surveys of the longitudinal study (TAPS) serve as the empirical touchstone for the analyses. For most outcomes of the longitudinal study, the yearly surveys went from 2002 until 2010. Some outcomes we started measuring later, and one outcome we skipped measuring a couple of years. Not until 2005 did we ask about misadventures the past year or remittances received the past

week, and feelings we asked every year but missed asking in 2007-2008. A quick scan of Table 11.7 shows the most glaring holes in the data, a topic discussed later.

Insert Table 11.1

To widen the core dataset, I supplement it with the baseline survey (2008) of the randomized-controlled trial of income inequality (RCT-I) and with the baseline and end-line surveys of the RCT on savings (RCT-S, 2011-2012). Why use the baseline survey of one trial and the baseline and end-line surveys of the other? So far, most of this book has drawn upon the longitudinal study of 13 villages, with an extra village brought in for two years (2005-2006) to understand attrition from the longitudinal study. During 2002-2010, the longitudinal study was observational, meaning it was not part of randomized-controlled trials which, by changing outcomes, would have beclouded villagers' workaday life[iii]. When adding data from randomized-controlled trials to the core dataset, I had to assess if trials met the criterion of not having changed outcomes. The trial on village inequality did not meet the criterion. It changed behaviors (Chapter 4) and, for that reason, I used data from the baseline survey of that trial as it happened before we rolled out the treatment, large amounts of edible rice. In contrast, the trial on savings met the criterion. Transferring a saving box to a household head picked at random so they could hoard cash to buy expensive goods or ride out harm, did neither, nor did it accomplish much else[iv], making it acceptable to bring in end-line data from the savings trial to study the outcomes of this chapter. Surprisingly, having a savings box increased drinking. Since I eventually want to examine the connection between illness and drinking in an untampered setting without worrying about the effects of the trial on alcohol consumption, I deep-sixed end-line information from the savings trial when studying drinking.

When stitched to the core dataset, the extra datasets from the two trials enlarge the sample size and allows deeper understanding of some topics. Variables in supplementary datasets were often coded in the same way as variables in the core dataset; when this happened, I could expand the sample size of participants, the time span of the data analyzed, or both. The savings trial of 2011-2012 allows for a finer analysis of the uses of cash and credit to deal with wreckages since that trial asked questions we did not ask in other studies: Did you need cash to deal with the trouble? How much credit did you use? From whom did you get cash? When I saw that questions in the core and appurtenant datasets were coded differently, I harmonized them by putting them in the lowest common denominator, aware I was sacrificing information in so doing. For instance, the feeling of anger the past week, which was coded differently in different yearly surveys, became a binary variable, *Anger*, coded as one if the subject reported having been angry, regardless of frequency, and zero if the subject had not been angry. Since I amalgamate information from three studies spanning different dates and embracing different settlements, I note the studies and years used when presenting results, or I control for the study in some analyses. Appendix A summarizes the queries and guidelines surveyors followed to elicit answers about shocks and outcomes, and my comments on the questions and guidelines.

Yearly shocks: Methods to collect information and data quality

Methods. Surveyors provided modest guidance to draw out information from interviewees about adverse shocks: Tell me the misfortunes you had the past year (Appendix A). Adults listed their misfortunes and, for each misfortune, starting in 2005, surveyors asked

villagers what they had done and also asked them to estimate the misfortune's monetary cost. During 2004-2005, surveyors jolted respondents' memory by asking them if they had experienced any of the following: A death in the family, serious illness, theft, crop damage, loss of livestock, flooding, or fire. After writing villagers' answers, during those two years, surveyors asked about other misfortunes, about how they had coped, and about costs. After 2005, surveyors no longer prompted respondents by reading them a list; instead, they asked and waited for villagers to mention adversities without aiding their memory. Throughout the studies, when asking about sickness during the past year, we instructed surveyors to record only grave illnesses.

For each shock, surveyors asked villagers to tell us how they had managed the shock, whether they had relied on institutions or individuals. For each shock, too, we asked villagers to give us their estimate of the cash value of losses from the misfortune, with a couple of exceptions. For grave illnesses, we told surveyors to impute 20 *bolivianos* for each day reported lost to work. This we did to iron out noise between respondents, aware that the value of a day lost to work from illness would vary by traits of the person and settlement. In addition, when villagers reported a marital breakup or having been the butt of gossip, villagers were imputed no cost for the misfortunes. Indefinable and complex, gossip and a marital split resist a price tag. Reported costs I changed to inflation-adjusted (real) values by using Bolivia's Consumer Price Index (Chapter 8).

2016 was an *annus horribilis*. The flood of 2006 galvanized outside institutions to aid harmed villages by giving them free food and tools. The flood and aid prompted us to add two specialized modules to the 2006 survey, one on emigration from the village and one on aid goods received by villagers. The timing of the survey, the dry season immediately after the flood, allowed us to ask questions about the amount and value of goods received, and attitudes to the flood. The first module, aimed at adults, had questions about regret at not having safeguarded their properties from the flood, and whether they would have done things differently. The second module concerned the household rather than the adult, and had questions about the goods obtained and about the institution supplying the goods. Surveyors valued goods using current prices in the town of San Borja.

Data quality. The core and additional datasets had weaknesses and, of the two modules on flood aid, one was useful, the other not; the uselessness of the latter had nothing to do with methodological shortcomings and will be discussed later.

[i] Shock type. The first shortcoming was some shock inflation from double counting. Loss of crops, deaths in the family, or misadventures wounding the whole household would likely have been reported the same way by adults in the household. The household did not suffer two deaths; it suffered one death reported twice, once by each spouse, for example. Second, the data has some spurious diversity. In the same household, people might view the same shock in different ways. The loss of a bantam one person ascribed to theft, another to predators. Same objective event, two answers in the dataset. On the upside, dissociated data brings no harm in portraying the subjective diversity of shocks seen by respondents. Third, by joggling memory, prompts goosed the number of shocks reported; used in some years, prompts will affect trends. As we shall see, 2004 had more shocks than most later years, probably from reminders used in early years. Fourth, we should have been clearer on what we meant by a shock and by how many shocks we asked villagers to list. Later we will see that most villagers mentioned one

misfortune, likely because they understood the question to refer to the main shock and because they wanted to shorten the time spent on the survey, as discussed next.

[ii] *Coping*. The way we coded how villagers coped with shocks has at least three faults. [a] <u>Overlapping codes</u>. We developed pointillistic codes for ways of coping with shocks without realizing codes overlapped. Someone who said they had coped with a shock "Alone" (option 1, coded as *Alone*) could have meant they had been unmoored, doing something to cope with the shock, but doing it by themselves, literally alone, without saying what they did. Others, instead of saying "Alone", could have done something by themselves and said what they did, like "by myself, without aid, I sold forest goods" (option 2, coded as *Forest goods*), "I looked for a job and then I worked for a wage (option 3, coded as *Wage labor*), or alone I stood in quiet nothingness (option 4, coded as *Nothing*). People who said they had handled bad luck "Alone" could have been people who had sold goods or labor, or stood still. The answer "Alone" includes a lot. Another example. A respondent who said they had gone to the "hospital" could have gone to the hospital in town (one coding option) or to the clinic of missionaries in the outskirts of the town of San Borja (another coding option). For some answers, the trouble of not having mutually exclusive answers I tackle by recoding coarse information and putting the cleaner information in a new variable, such as *Hospital* for a visit to any hospital. [b] <u>The variable *Other*</u>. When asked how they had coped with adversity, villagers in 10% of cases gave us an assortment of answers jarring with common codes. These motley answers were coded as *Other*. We don't know what lies inside the fat bin *Other* because we did not push respondents to tell us what they had done and jotting their answers in the survey's marginalia. [c] <u>How many ways of coping</u>. For each misfortune surveyors entered one way of coping. We assumed the singular answer was the most important, but it doesn't tell us if villagers used more than one way to cope with a shock[v].

When answering questions about misadventures and coping (and other topics of the book), seasoned respondents could have learned that saying "yes" to forking questions would chain them into having to answer more questions. They probably learned that saying "yes" to the floodgate question about having experienced a shock in the past year meant they had to spend time answering questions about how they had managed the trouble and estimating the shock's cost. One way of lightening their burden was for villagers to say "no" early on in the survey and be done with it. Later we will see that the chances of reporting a shock and the number of shocks reported declined yearly in the longitudinal study, perhaps because villagers got savvier about skirting questions.

[iii]. *Costs*. I cannot fathom how villagers costed out a shock, unless the shock referred to the loss or damage of a goods, like the loss of livestock or the wreckage of a canoe. Even among goods, trouble loomed. When asked about shocks, a villager could have said they had lost a canoe, which they probably made and, for that reason, was hard to value, especially if the old canoe was scaly and creaky (Chapter 9). In the years and studies with cost data, 14% of people who reported a misfortune had zero costs attached to their misfortune[vi]. Null values we imposed on some shocks, like divorce or gossip, but other zeros came from villagers who, burdened with having to make abstruse calculations to please surveyors, gave up and said the shock had no cost, or from those who felt the shock cost a pittance, a value they rounded down to nothing. During the years when we asked about costs (2005-2010), a bedridden person was assigned a loss of 20 *bolivianos* for each day unable to work. Set in 2005, the daily cost of being bedridden stayed the same until the end of the longitudinal study[vii].

[iv]. Flood of 2006. Of the two modules to examine the effects of the 2006 flood, the one on emigration had almost no variation while the one on aid goods received by a household lacked blatant flaws[viii].

/v/. Missing observations. The datasets had few missing records. Everyone whom we asked answered questions on whether they had suffered a shock and how they had dealt with it; most provided cost estimates as well[ix]. The only gaps came from the 2011-2012 trial on savings. There I found *i)* 4.38% missing values among those who said they had used cash to cope with a shock but didn't say how much cash they had used, *ii)* 5.34% missing values among respondents who had misfortunes but did not say if they had borrowed money to weather the shock, and *iii)* 1.66% missing values among villagers who acknowledged using cash to cope, but did not say if outsiders had supplied the cash. The percentages do not strike me as grievous.

/vi/ Duplicates. I didn't find much evidence spouses repeated each other's answers. When we interviewed a spouse, we did not code for the proximity of the other spouse; we cannot tell if a spouse interviewed later repeated what they had heard. The evidence is equivocal. I doubt eavesdropping caused fake intra-household agreement because surveyors often interviewed spouses apart and because data suggests spouses disagreed. Some injuries, like a death in the family, crop losses, and floods, befell the whole household. For those misadventures, wife and husband should have concurred. They did for deaths, but not for crop losses or for floods. In a yearly survey, compared with her husband, a wife was 2.4 and 1.2 percentage points less likely to say she had suffered from crop losses or floods[x].

Yearly shocks: Results

Sample size. Across the nine years of observation (2004-2012) and the three studies, our team surveyed a total of 7,632 adults, many of them more than once since they took part in the longitudinal observational study (TAPS) or the savings trial (Table 11.2A), each of which ran for at least two years. TAPS had the largest number of people (4,427), followed by the savings trial (1,839); data for the trial on village income inequality had the fewest observations (1,366 people) because it came from one baseline survey done in 2008. The average yearly sample of subjects reached 763 (standard deviation [SD] = 234), but was swollen from the large number of people in the two randomized-controlled trials. If I take out the sample from the trials, the average yearly sample drops from 763 to 632 subjects (SD = 122). The average yearly sample of TAPS did not change noticeably from 2004 until 2010, but had periods of high attrition, such as happened from 2006 to 2007 when the study lost 71 subjects (10%), and periods of high recovery, such as took place from 2009 to 2010 when the study gained 62 subjects (10%). Between 2011 and 2012 the savings trial lost 135 participants, equivalent to 13% of the baseline sample.

Insert Table 11.2

Shocks: Frequency. Figure 11.1 and Table 11.2B show that ~67% of all women and men interviewed (n = 7,632) said they had no misfortune to report for the past year. The shares were higher in *i)* the longitudinal study of 2004-2010 (72%) and in the baseline (2008) of the trial of village income inequality (73%) than in *ii)* the savings trial of 2011-2012 (50%). Three reasons come to mind for the difference of 22 percentage points between *i)* and *ii)*. In the savings trial we were searching subliminally for shocks; we put shocks in the limelight because we thought

cash hoarding, facilitated by owning a savings box, would help owners sustain misadventures. We sought, we found. The other two reasons are related and plainer. Possibly, the years when the savings trial happened were harsh, blanketing the area with wreckages. Further, the larger number of villages in the savings trial (n = 61) compared with the number of villages in the other two studies ─ 14 in TAPS, 40 in the income inequality trial ─ brought in fresh data from sorrowful villagers whom we hadn't seen before. I somewhat doubt it. To explore the last point, I pulled out the 14 villages that had been part of the longitudinal study (2004-2010) from the savings trial. For these villages, I had data spanning from 2004 until 2012 and could figure out if there was a sharp break in the share of adults reporting shocks before 2010 (when the longitudinal study ended) and after 2010 when we the savings trial happened. Forty-eight percent of adults from the 14 villages who took part in the two studies said they had experienced a shock during 2011-2012; a year earlier, in 2010, the share had been 16%. To me, the numbers say the gargantuan uptick of 32 percentage points in the share of adults seared with mishaps stems from differences in methods of garnering information between 2004-2010 and 2011-2012 than in objective changes in living conditions.

Insert Figure 11.1

Women were more reticent about acknowledging shocks than men (Figure 11.1). Sixty-three percent of men but 69% of women said they had not faced a shock in the past 12 months. Answers differed by study. In the savings trial, half the women and half the men said they had no unfortunate event to report for the past year, whereas in the longitudinal study and in the baseline survey of the trial on village income inequality, ~75% of women and ~68% of men in each study said they had nothing jarring to relate. In general, sex differences seem small[xi].

Those who recounted at least one adversity in the past year had an average of 1.25 adversities and an unwavering median of one (Table 11.2C; Figure 11.2). The savings trial in 2011, with a high average of 1.74 shocks per adult, pulled up the mean of the rest; without 2011, the average number of shocks per person drops to one, in line with the average for the other years and studies. Two explanations here, one about atypical values, one about variation. First outliers. In 2004 and in the savings trial of 2011-2012, the mean number of shocks per person was higher (1.20 in 2004 and 1.18-1.74 in 2011-2012). I hazard to surmise that the high value in 2004 came from the use of prompts to refresh respondents' memory, prompts dropped after 2004. The *per capita* number of shocks was higher in the savings trial because we searched for shocks. Next variation. Figure 11.2 shows a narrow spread in the number of shocks; few people had more than one, and none had more than five. In the years 2006, 2008, and 2010 of the longitudinal study there was no, or almost no, variation in the number of shocks because most everyone reported one shock.

Insert Figure 11.2

Shock: Types. Table 11.2D and Figure 11.3 display the shocks assailing Tsimane'. The graph shows illness as the undisputed ravager. Fifty-four percent of respondents who felt a shock called it sickness. Runners-up came far below; crops losses (9%), floods and theft (6% each), and deaths in the family (8%), the last percentage puffed up by a modicum of double counting. From all we have examined, I see a stolid or lucky bevy of villagers free from shocks, other than illness.

Insert Figure 11.3

Coping with shocks. A sizable share of those afflicted with shocks stood still (Table 11.3). In the two studies in which we asked about shock management (TAPS and inequality trial), 32% of adults reporting a shock said they had done nothing (median = 36%). The highest and lowest percentages came from the longitudinal study (TAPS), 54% in 2006 and 11% 2008.

Insert Table 11.3

Figures 11.4a-11.4c display what adults harmed by a shock did to lighten the burden. I start with the histogram showing disaggregated responses (Figure 11.4a). More than a third (36%) of those hurt did something, but alone. Next came family. Nineteen percent got help from family, however defined. Nine percent went to a hospital, understandable since most people singled out illness as the chief misadventure. The bin *Other* had 10% of miscellaneous ways of coping with shocks. Other than family and hospitals, no other way of handling shocks stood out. The discrete options one associates with the market economy like credit (3%), wage labor (4%), or sale of goods (5%), mattered little on their own. And so did any and all governments; in only four percent of cases did Tsimane' get help from their tutelary governing body (Tsimane' Council), town halls, or regional governments.

Insert Figure 11.4a

What villagers did when out of pink requires a comment since sickness stood out as the most frequent shock. The histogram in Appendix B shows that 34% of those who reported an illness endured it alone. Half as many (17%) relied on family while 10% went to a hospital or did nothing (5%).

To spot patterns lost in the many columns of Figure 11.4a, I merged thematically related columns and put them in Figure 11.4b. In the column named *Individual* I put those who borrowed money, worked for a wage, or emigrated. *Sale* stands for vending forest goods, livestock, or farm crops. Under *Institutions* I put missionaries, hospitals, and our long-term study since we offered help for those who asked us when in distress (Chapter 4). The bin *Government* includes the governing council of Tsimane', the government of nearby towns (city hall, in Spanish *alcaldía*), and the regional government.

Insert Figure 11.4b

Networks helped most (Figure 11.4b). In 19% of cases, villagers turned for aid to family and non-family members. Institutions came in a close second (16%). I regrouped the bins of Figure 11.4b to obtain a better understanding of coping. First, I assessed how much Tsimane' had relied on the market economy to get by a shock. From Figure 11.4a I added the percentages in the bins on sale of livestock, farm crops, and forest goods (5.5%) + credit (3.4%) + wage labor (4.1%) and found Tsimane' turned to the market in 13% of cases. Figure 11.4b shows Tsimane' went to government agencies in four percent of cases, but the conclusion reflects ambiguities in the bins' content. The column *Hospitals* in Table 11.4a includes government hospitals and the clinic of missionaries. If we assume Tsimane' went mainly to government

hospitals and add the share of people who relied on *i)* town halls (0.3%), *ii)* regional governments (1.3%), and *iii)* hospitals (8.9%) the public sector helped in 10% of cases, almost the same as the share helped by the market (13%). To capture any formal help from outsiders, and given the ambiguity of where to place hospitals, I lumped the columns *Institutions* and *Government* from Figure 11.4b. Result: when dealing with a shock, Tsimane' turned to formal outside help 20% of the time.

In sum, after a shock, Tsimane' walk a lonesome road. Most (32%) did nothing, or handled the misadventure alone (36%). Of those who mentioned a particular step to cope with a shock, 20% got help from social networks (chiefly family) and another 20% got aid from formal institutions (private and public) and governments. Market mechanisms played a smaller role, helping 13% of the time.

Generalizability. Figure 11.4c, a near mimesis of Figure 11.4b, I include to assess how far one can generalize findings from the longitudinal study. Figure 11.4c replicates Figure 11.4b but is restricted to 2008, the only year the longitudinal study and the trial on village inequality had in common. We see once again the tropism of coping alone. In either study, the share of villagers who said they handled alone the misadventure towered over other ways. About 50% of villagers in the longitudinal study and a high but lower percentage (33%) of villagers in the inequality trial said they handled the mishap single-handedly. One difference, however. In the inequality trial networks helped more, accounting for 23% of assistance, compared with 15% in the longitudinal study. Tsimane' along the Maniqui River whom we followed in the longitudinal study came from a more individualistic branch, perhaps with more callous networks.

Insert Figure 11.4c

Coping: The use of money. We saw that through credit, wages, and sales, the market economy helped villagers weather shocks in 13% of instances (Figure 11.4a). The finding came from two studies, but excluded the trial on savings because in the savings trial we did not ask about coping. However, the saving trial had gimlet questions about the uses of money to deal with a shock, and Table 11.4 shows what we found. Thirty-two percent of women or men who reported a shock said they had used cash to fix what shocks had besmirched (Table 11.4, part A), but only six percent borrowed money (Table 11.4, part B), higher but within the low figure of 3.5% of villagers from the other two studies who employed credit after a shock (Figure 11.4a). We can say with assurance that by 2012, Tsimane' did not lean on credit to iron out mishaps, but they did lean on cash. Sixteen percent of those interviewed (women = 19%; men = 13%) said someone else had paid with money to help them with the misfortune (Table 11.4, part C). The survey does not say if those payments were pure gifts, perquisites of a long-term exchange cycle, or interest-free loans.

Insert Table 11.4

Shock's costs. In the longitudinal study and in the inequality trial we asked villagers who had borne a shock to appraise its cost. Summed among respondents in a household who reported shocks with costs greater than zero, average and median yearly real losses per household reached 832 and 362 *bolivianos* (SD = 1293) (Figure 11.5). Households in the inequality trial had higher average yearly real losses (960 *bolivianos*) than households in the longitudinal study (TAPS; 780 *bolivianos*). Households in the inequality trial had higher average yearly real losses (960

bolivianos) than households in the longitudinal study (TAPS; 780 *bolivianos*). Assuming the average household had six people and Bolivia's currency exchange rate was seven *bolivianos* to the USA dollar, an average and median loss of 832 and 362 *bolivianos* translates, in USA dollars, into a mean and median daily loss per person of $0.05 and $0.02. How much of an economic burden do the losses represent? To answer the query, I express the shocks' costs as a share of daily *per capita* income. In the conclusion to Chapter 10 I showed that daily *per capita* income among Tsimane' reached $2, next to which a loss of $0.02-$0.05 seems like a trifling amount.

Insert Figure 11.5

Flood of 2006 in TAPS's villages. Our goal had been to study emigration engendered by the flood of 2006 to understand improvidence, but we could not reach the goal because hardly anyone emigrated. Only seven of the 679 adults in the sample left[xii]. Most villagers stayed in their community, probably because they saw outside aid haring to them. Of the seven adults who left, five regretted not having taken steps to shield themselves from the flood's rack; none of them said they would do things differently next time.

To help with the inundation, Bolivian and international organizations delivered 50 distinct types of good to 241 of the 261 households in TAPS villages. Twenty households were missed because they were absent when aid teams arrived. Organizations gave out a total of 1,465 items. Most items included housewares (41%), food (34%), and equipment (16%)(Figure 11.6a). Households received a mean and median of 239 and 133 *bolivianos* worth of goods (SD = 200) (Figure 11.6b), lower than households' estimates of financial losses from all shocks in 2006. The standard yearly modules of shocks for TAPS households for the calendar year 2006 shows villagers estimated their households lost a mean and median of 622 and 237 *bolivianos* from shocks (SD = 1088). Transfers from aid teams erased about two thirds of the mean loss (239/622) and about half of the median loss (133/237).

Insert Figures 11.6a-11.6b

By the total number of goods or by the total value of goods given to Tsimane', the Red Cross came out on top of aid agencies. They supplied 68% of goods (Figure 11.6c), accounting for 78% of value (Figure 11.6d). Next came the Tsimane' Council, which supplied 13% of goods, amounting to nine percent of value. Further down came institutions like the city hall and Save the Children; they transferred 10% and 2% of goods, equivalent to six and to one percent of all aid value.

Insert Figures 11.6c-11.6d

Trends over time. During the study period 2005-2012, Tsimane' became less vulnerable to misfortunes and less likely to be hoised by their own inaction. The chances of colliding with an adversity and the number of adversities borne declined yearly by 5.6 percentage points and 4.9%, while the probability of taking step to cope with a shock rose by 2.3% each year (Table 11.5; columns 1-3). Women and men had similar trends[xiii]. During the narrower window of time (2005-2010) when we measured shocks' cost, the real financial burden of shocks did not change

(Table 11.5; column 4), most likely from our having kept constant at 20 *bolivianos* the forgone daily earnings due to illness.

Insert Table 11.5

The chances of reporting a shock and the number of shocks reported declined yearly, a trend stemming from methodological and substantive reasons. Villagers in the longitudinal study and in the savings trial could have learned that saying "no" to the initial question of whether they had a shock would save them time by not having to answer later questions about details of the shock. Indirect evidence bears out the interpretation. I compare the share of villagers in the longitudinal study with the share of villagers in the trial on village inequality who said they had not suffered a misfortune the past year. The first group had taken the survey many times; the second group, made up of fresh recruits, had not. The longitudinal study had a higher percentage of noes (82%) than the trial on village income inequality (73%) (Table 11.2B). Besides the role learning could have played in the trend of more noes (and lower likelihood of finding shocks), changes in pain tolerance or forbearance could explain the trend. What used to distress in the past became the unremarkable new normal as Tsimane' hardened to setbacks. A meliorist would argue the decline, instead of evincing the workings of the mind, semaphored improved objective living conditions, free of past pains. Possibly.

Summary. Tsimane' inhabit a world safe and vulnerable. A third of respondents had no shock to report (Table 11.2A). The chances of reporting a misadventure and the number of misadventures suffered declined every year (Table 11.5). The financial setback of shocks was small, at most about a nickel per day per person, a pittance next to a *per capita* income of $2. These positive features were offset by discomforting ones. When shocks struck, 32% of those interviewed did nothing while a quarter said they dealt with the mishap alone (Table 11.3). One could interpret the high share of "Nothing" in several ways. A toughen backbone and self-reliance guided villagers through gray weather and small mishaps; for large troubles, they waited for outside institutions to step in. Either attitude would induce a passive poise to shocks. It is as though they were saying, "I'll deal with small distresses because outsiders will help me with the big ones." When those afflicted by a shock did something other than bear the shock with fortitude, they leaned on family (20%) or institutions (20%), more than on the market economy (13%). There is meager evidence Tsimane' relinquished livestock, relied on village forests, sold farm crops, or got in hock to safeguard welfare.

Sickness ranked as the top misfortune, listed year after year, study after study. I probed into how the sick handled illness. We saw earlier and in Appendix B that with illness, as with other shocks, Tsimane' withstood the distress alone, or got help from family. This doesn't tell us if the sick needed cash to visit health-care providers or to buy drugs. Other than the savings trial (2011-2012), we did not pointedly ask villagers if, for each shock, they had used cash. Answers to the two questions ─ on shocks and if they had used cash to purchase medicines ─ I summarize in Figure 11.7.

Insert Figure 11.7

One feature stands out. Tsimane' did not use cash to get by most misadventures, but with illness and with deaths in the family cash came in handy. Over the two years of the savings trial

(2011-2012), 77% and 65% of villagers who reported sickness or family deaths used cash to ride out the misfortunes[xiv].   No other shock came close in requiring money.

A bigger lesson lies behind these ciphers. With food, land, family, and myriad forms of wealth at their disposal, why would people near autarky enjoying the social sinecures of the group dive into the market economy? Among the answers for which we have data, sickness and death in the family emerge as reasonable. Between, on the other hand, sickness, convalescence, and deaths in the family, and, on the other, the need for cash lie many paths, such as the loss of ethnobotanical knowledge and the availability of cheaper medical treatments. These paths press and pull villagers to the market economy. In the past, poor health took the afflicted to shamans or to the forest for a salve to pain. When someone in the household died, survivors abandoned the house and built a new one with the help of villagers. Healers, neighbors, and wild plants served as cushions. At present, deaths in the family, indisposition, major ailments, or healing take Tsimane' to hospitals, private health-care workers, and drugstores, all of whom demand cash payments, even traditional healer (Appendix C). After a fatal malady in the family, villagers still rely on neighbors' help to erect a new home, but helping hands no longer suffice; when building a new house today Tsimane' need cash to buy tin roofs, metal nails, wires, tarps, and padlocks. Sickness and death fundamentally squeeze Tsimane' into the money economy.

Illness and correlative outcomes among adults during the past week: Univariate analysis

Having finished with the analysis of shocks during the past year, I eventually want to provide a stereoscopic yearly analysis of the *(i)* the association between illness during the past week and contemporaneous help received and *(ii)* assess if help tempered the likelihood bedridden people would drink alcohol or have negative emotions. Nevertheless, before examining the two topics I do something more basic in this section, namely I define, show descriptive statistics, and discuss problems with each of the variables used to analyze topics *(i)* and *(ii)* before addressing the two topics. In this section I welcome multiple observations for a person in a year because I want to mine the data's richness. For instance, for each year, I tally the different types of gifts received the past week; one adult could have three observations if they were gifted rice, meat, and shoes. By honoring disaggregated data, I can spot details; I can see the adult got meat and not plantains. The particulars get erased once I abridge information to one yearly record per person, like the total number of gifts received a year, which is needed to address topics *(i)* and *(ii)*.

Illness. Surveyors asked about any morbidity the past seven days, and about the number of days, if any, each morbidity had kept the respondent in bed. After listening to their answers, surveyors asked if, besides the morbidities respondents had listed, respondents had parasites, sore throats, fever, cough, diarrhea (with and without blood), and open wounds. The questions were address to all villagers, adults answering for themselves, caretakers on behalf of dependents under 16 years of age.

One remark about the data first. Given the broad scope of the initial question and the leeway to answer it, the question produced an argosy of answers. For what a doctor would consider one illness, villagers with that illness reported the illness or its symptoms, or both. For a common cold, for instance, some said a cold, others a grippe with fever, others a cold with cough, and so on. Surveyors stuck close to what people said. The coarse data is annoying and

unsuitable to identify objective illnesses, but displays the morbidity canvas Tsimane' see and feel.

Of the 16,073 yearly surveys of children, frumberdling, and adults, 23% reported having been bedridden. Villagers listed a total of 99 morbidities of which 13 accounted for at least one percent of observations. Figure 11.8 shows the most important ailments and symptoms confining Tsimane' to bed. The most frequent disorder was the common cold (49%), followed by diarrhea and fever, each accounting for eight percent of observations, tapering off to various bodily pains. The complaints and maladies keeping the sick in bed do not seem to be grave enough to spark help from neighbors; the figures likely capture illnesses that kept young children in bed. In analysis not shown, I find that the number of ailments and symptoms afflicting a person barely changed, declining by 0.6%/year during 2002-2010. Girls and women were five percent more likely to report a symptom or illness than males[xv].

Insert Figure 11.8

Gifts and labor help. From the outset of the longitudinal study in 2002, we asked villagers about unpaid labor help or gifts they gave the past week to anyone beyond their household. In 2005 we began asking not just about help and gifts proffered, but about help and gifts received. What people received is more important for this chapter because we want to know whether illness sparked help from outsiders. Whether for gifts or for labor help received, surveyors asked simple questions.

Gifts. The questions were: "What gifts did you get the past week from people outside your household" and "Who gave you the gift?" Surveyors coded each gift received by respondents. Using village prices or the price traders sold or exchange goods, surveyors imputed a value to the gift and coded for the type of gift giver (e.g., a family member from the village, someone from another village). Answers to the questions allow one to identify the gift and the general type of giver, but fall short in providing a full view of the event. We did not include the amount received; we might know the person received deer meat or eggs from an unrelated villager, but we don't know the kilograms of meat or the number of eggs. All we know is the total monetary value of each transfer. Second, villagers somewhile used a general label when a more specific one would have been better. Villagers sometimes said they got generic "meat" while others mentioned they got "deer meat"; the two answers show up as different entries in the dataset. Third, we did not make surveyors follow the same guideline when assigning values to gifts. Some of the variation in gift values reflects differences in valuation approaches. Last, we did not ask about the specific identity of the gift giver, a pity because, had we done so, we could have estimated the social distance between giver and receiver.

During 2005-2010 we asked 5,209 adults about gifts received; only 15% (n = 821) of them had gotten a gift the past week. Fifteen commodities accounted for 82% of all gifts (Figure 11.9), food being the most popular. Among foods, animal proteins ranked at the top. Thirty-one percent of gifts were unidentified meats (17%), 3% jerky, 10% game, and a further 18% were fish. Thus, half the gifts landed packaged as animal protein. The four staple farm crops (rice, manioc, plantains, maize) together captured 24% of gifts. Of commercial foods, only sugar (barely) made it to the top 15 items gifted, accounting for a paltry 1.59% of gifts.

Insert Figure 11.9

After adjusting for inflation, the mean and median values of gifts were 17 and 13 *bolivianos* (SD = 16) (Figure 11.10), equivalent to about two USA dollars, the same as daily *per capita* income (Chapter 10). Eighty-four percent of gifts came from close family (Figure 11.11). The information is too coarse to tell us who were the other givers, but it suggests that most gifts came from co-ethnics rather than from outsiders, such as highlanders or Spanish-speaking, White lowlanders (*napo*).

Insert Figures 11.10-11.11

The information confirms and belies my priors. For decades anthropologists have been underscoring the importance of animal proteins in the diet of native Amazonians. Our findings buttress common lore. Every other gift received was meat or fish of some ilk. Priors confirmed. Nevertheless, our data does not fit slickly with the ethnographic canon about the ubiquity of exchanges in small-scale, non-industrial societies. Across all years and studies, only 15% of people (821/5209) received a gift the week before the interview. On the surface, the percentage strikes me as low, but one could argue otherwise. For instance, one might say these gifts of generally high financial and cultural worth arrived when the disconsolate needed them most. The timing of the gift could matter as much as its type, frequency, and value.

Labor help. Questions about unpaid labor help received followed the same spirit as questions about gifts received, "Has anyone beyond the household offered you labor help the past week" and, if so, for "what type of activity did you get help, and who helped you?" Villagers could say "no help", or they could say they got help for a task like farming or for making an artifact, like a canoe. Surveyors computed the number of people who helped and the number of days a villager got help, and converted the figures into a total of person-days received. The question about the identity of a helper was coded in the same blunt way as the question about the identify of a gift giver.
Figures 11.12-11.14 show that what we find with labor help received echoes what we found with gifts received. Of the 5211 records of people with information on labor exchange, four percent (n = 228) got help (Figure 11.12), almost always for farm chores. When they got help, the few who got it benefitted with an average and median of 3.8 and two person-days of help (SD = 3) (Figure 11.13). As we found with gifts, most help came from close family (Figure 11.14).

Insert Figures 11.12-11.14

Sutured, data on gifts and labor help received show a self-reliant people. We don't find evidence of general exchange of goods or labor, as one might have expected. The aloneness found with data from the past week reminds me of the solitary stance Tsimane' took when facing misadventures during the past year.

Credit received. We posed two sets of questions about monetary credit. The first dealt with any loan fetched the past seven days: Lender, amount, reason. The second assessed whether villagers could borrow if they faced an emergency.
Loans received were rare, and because they were rare, the loan's details seemed easy to remember. Accurate or not, information on loans had few missing values. In only one of 7111

records was there a missing value for the lender's identity. The file on loans had mostly one record per person. When asked how many times they had borrowed cash the past week, three villagers mentioned more than one loan. Of the 7111 records, six people (0.08%) received more than one loan the past week. Information on the use of loans for emergencies likewise showed few missing values and generally one record per person[xvi]. During 2002-2010, nobody failed to answer the question of whether they could borrow 100 *bolivianos* for an emergency, but during 2006-2010, 12 of the 7089 respondents did not say how they would get 100 *bolivianos* if they faced an astringent roadblock.

Figure 11.15 shows Tsimane' seldom borrowed money. Of the 7105 adults surveyed during 2002-2010, 6.6% (n = 475) got loans. Close to 60% of loans came from fellow Tsimane'; traders, market's emissaries, came in a distant second place, supplying 14% of the loans. For the sub-set of those who fetched a loan (366 of 475) we have information on why they got one (Figure 11.16). Most (35%) villagers got loans to cover subsistence gaps, like food purchases. Then came loans to travel to town (25%), followed by loans to cover medical expenses (17%) and to buy durable goods (14%). Tsimane' did not use loans for superfluities; one percent took out loans to appease indulgences. Loan amounts went from a low of two to a high of 10,000 *bolivianos*. The median amount reached 32 *bolivianos* (Figure 11.17), equivalent to about four dollars, a large value since daily income per person is in the neighborhood of two dollars.

Insert Figures 11.15-11.17

In sum, loans flowed in sporadically, mostly from Tsimane' lenders, to cover subsistence holes, in amount that, though neither trivial nor outlandish, seemed meaningful compared with the average daily income of Tsimane'. If we only knew more about why they got loans, the sureties, or the interest on loans we could round out the picture. Perhaps, as in other lands, unprincipled, very hungry caterpillars charging extortionate rate supplied the loans, which arrived at dark turning points to help borrowers avoid the maw of privation.

Figures 11.18 shows the share of respondents who, when faced with an emergency, said they would do nothing or deal with it alone. Forty-six percent of all those interviewed said "Alone" (Figure 11.18), but the average belies differences between studies. True, Tsimane' along the river Maniqui (TAPS) were evenly split between those who stood alone (49%) or had a fallback option such as a loan (51%). Beyond the riparian settlements, among the settlements in the wider catchment of the randomized-controlled trial on income inequality, lay a less vulnerable population; only 34% said they would face an emergency alone.   If Tsimane' cannot borrow, what would they do when in need? The answer lies in Figure 11.19.

Insert Figures 11.18-11.19

During 2006-2010 we collected a total of 4516 observations, one per adult each year. Of the respondent, 33% (n = 1471) said they would do nothing to face the exigency or would withstand the exigency alone without asking for credit. Figure 11.19 shows that, of those who would do something to obtain 100 *bolivianos* (n = 3045), 38% would sell crops and 35% would try to get a loan. After these choices, options dwindled to things like work (8%), rely on family (7%), and sell forest goods (6%) or livestock (4%). On purpose, to underscore their unimportance, I left in the graph barely visible bars like savings, emigration, our study (TAPS), missionaries, and the municipal government, together responsible for less than one percent of

observations. Answers make sense. We didn't ask what crops they would sell, but I imagine the sale of hardy perennial plantains could serve as a cash cushion any time, and rice sales could help shortly after the rice harvest. Credit too is unsurprising. We saw that half of those interviewed mentioned having potential access to a loan in an emergency; the 34% in Figure 11.19 falls within the ballpark. The small bins for work, family, or savings, I understand because work is seasonal and most Tsimane' live in a cashless world. Villagers cannot turn to family for a loan nor can they withdraw much money from their cache of coins. Unless they knew and trust requesters and their surety, a villager, a missionary, or a store owner are unlikely to lend money[xvii].

Remittances. Starting in 2005 we asked adults about cash gifts received the past seven days, the past 8-14 days, and the past two months (excluding gifts received the past fortnight). We asked subjects for the value of the cash gift, the identity of the giver, and subjects' perceived reason for getting the gift. Instructions were clear, we thought; surveyors were told to exclude monetary earnings, loans, and government transfers like old-age pensions.

The question of why they got the gift led to jumbled answers. Some villagers answered by pointing to the gift giver, like a trader or a fellow Tsimane', others mentioned the end uses of the gift, like buying food, others imputed a motive to the donor, like kindness. In hindsight, we should have asked what villagers did with the cash they got. The flaw does not matter for our purposes for we care more about the frequency and value of gifts received than about the motive behind the gifts. The hodgepodge of answers is no impediment to the analysis.

Villagers seldom received cash gifts. Of 5023 people with information on cash gifts during 2005-2010, 1.1% (n = 60) reported receiving such a gift the past week (Figure 11.20). Rarer still were people getting more than one gift; four of the 60 gift recipients got more than one gift. What is obvious but unsurprising is that most transfers came from Tsimane', 89% to be exact. If Tsimane' had established trusting bonds of ritual kinship with outsiders, one might have expected more transfers from White Spanish-speaking lowlanders, smallholders elbowing their way into the homeland of Tsimane' or, perhaps, even town dwellers, but none of them figured noticeably in cash donations[xviii]. When they got cash gifts, Tsimane' used the money to buy food (36%) and clothing (20%), pay for health care (10%) and fares (16%), and buy miscellaneous goods (Figure 11.21). All gift money went to workaday ends, none to buy luxuries. The bin "Gift" has cases when villagers mentioned the givers' kindness as the reason for the donation (n = 5; 10%).

Insert Figure 11.20-11.21

Figure 11.22 shows the worth of gifts. For the figure, I purposely lengthened the recall period from one week to two months to dredge up more data on gift values. Values varied from pocket change of one *boliviano* to a high of 699 *bolivianos*, with a respectable mean and median of 81 and 50 *bolivianos* (SD = 105), equivalent to 7-11 USA dollars. Respectable because daily income per person fluctuates around two USA dollars[xix].

Insert Figure 11.22

We know nothing about the gift's context, meaning we do not know if the transfer was part of an exchange loop one finds in non-industrial societies, or if it was a one-time unselfish act

of kindness. Nor do we know the gift's etiology. Possibly, the gift giver sensed the needs of the unfortunate and gave them unconditional cash. We don't know. Regardless of context or cause, presents of cash were infrequent.

Feelings. I want to know eventually how far illness and the psyche move in unison, and to that end, in this section, I describe what we found about the psyche.

We asked villagers about some of their positive and negative feelings the past seven days: "How often were you angry at family members, at others? How many times did you experience fear, sadness, happiness?"[xx] Besides asking these questions, surveyors coded if villagers smiled or laughed during the interview. Putting aside how respondents might have understood the queries or how the year-to-year visit of (the same) surveyors might have colored respondents' mood, the information gathered had two weaknesses. We were inconsistent in how we coded answers. In the early years, answers about feelings were coded as never, sometimes, often; later, answers were coded in cardinal numbers. I cleared up coding clashes by creating binary variables, equaled to one if respondents reported having had the feeling irrespective of how often, and zero if not. While technically acceptable, the solution erased much of the variation in the original data. In addition, the data had holes. In the longitudinal study we almost always asked about feelings, but not during 2007- 2008, and in the baseline of the randomized-controlled trial we asked about sadness and general anger at those outside the family, but not about other feeling. Smile was the one variable coded in the same way every year in both studies: [i] Glum for villagers who did not smile or laugh during the interview, [ii] Smile for those who only smiled, [iii] Laugh for those who laughed, and [iv] Guffaw for those who laughed aloud several times during the interview.

Figure 11.23 shows Tsimane' are a warm, emotionally complex, generally blithesome people. Seventy percent had not been angry at non-family members, 55% had not been mad at their family, 55% had not felt fear, 58% smiled and laughed during the interview, and 86% mentioned having felt happy the past week. Offsetting the cheerful side laid a slightly darker side. Sixty-two percent acknowledge having felt sad at least once the past week. In Figure 11.24 I home in on smiles because we coded it objectively and consistently. In the early years (2002-2005) most adults smiled or laughed; few were smileless and few let out guffaws. Starting in 2006 the share of adults who laughed rose. By 2010, 37% of adults smiled during the interview, 49% laughed, and 3.5% laughed loudly and frequently.

Insert Figures 11.23-11.24

Feelings clustered. Fear, anger, and sadness hung together; if adults said they had one of these bad feelings they were likely to say they had experienced another one (Table 11.6). The correlation between bad feelings and mirth was more nuanced; one did not go with the other in the way one expected. Smiling during an interview bore no correlation with self-reported feelings, except that those who had been angry at their family the past week were more likely to smile during the interview. Unlike smiling, self-reported happiness coexisted with bad feelings. People who said they had been happy the past week also said they had been angry at non-family members, sad, and fearful. What I get from Table 11.6 is a people with a thicket of antipodal emotions roiling inside them in a brief time. There might be nothing unique about the finding as it could reflect how information was collected. Unless never in anger, fear, or sadness, most humans display a packet of emotions. Sequential, discrete emotions experienced over a week

could explain the finding. Angry on Monday, annoyed at family on Tuesday, fearful on Wednesday, and by the time surveyors arrived on Saturday, negative feelings forgotten, the interviewee relaxed, smiled, and laughed with the interviewer.

Insert Table 11.6

Drinking. From the study's outset we asked about drinking liquor, or beverages accessible from stores and travelling merchants. The questions varied. Some years we measured beer consumption in bottles, other years in liters. In early years we asked about hard liquor, in later years we asked about hard liquor and beer. To iron out inconsistencies, I create a binary variable equaled to one if villagers consumed any alcohol, regardless of the measurement unit, amount, or type of alcohol; the variable equaled zero if a villager had been a teetotaler.

Two details before turning to the results. First, I did not include *chicha*, the traditional fermented beverage prepared by Tsimane' because *chicha* quaffing is a sign of sociality, for which I already have proxies (e.g., receiving gifts and getting labor help). Second, respondents could have downplayed the frequency and volume of alcohol consumed if they feared surveyors' displeasure. Protestant missionaries from the USA from their arrival in the homeland of Tsimane' in the 1950s until they left in 2008, reproved drinking among their charges. Perhaps unconsciously, villagers felt interviewers shared the animus against drinking of straitlaced priggish missionaries and pretended to be aquabibs. I doubt social desirability stained answers because surveys often happened in villages far from churches, beyond the keen and ears of proselytizing missionaries and their toadies, and because many surveys took place after missionaries had left their permanent residence in the homeland of Tsimane'.[xxi]

Figure 11.25 joins data from the longitudinal study of 2002-2010 and the baselines of the randomized-controlled trials on village inequality (2008) and savings (2011). The figure shows the share of adults drinking alcohol remained steady at 23% each year, though it fell to 18% in 2009 and peaked out at 27% in 2005. The percentage of drinkers was similar in the three studies. Twenty-four percent of adults in each of the two randomized-controlled trials and 22% of adults in the longitudinal study said they had consumed alcohol. What the numbers hide, though, are sex differences. In each study, four percent of women and 44% of men drank.[xxii]

Insert Figure 11.25

Brining it together: Association between weekly health and weekly outcomes among adults

Having reviewed each variable, I now address three topics. First, I assess if being bedridden is associated with getting gifts, labor assistance, or loans. Next, I judge if being bedridden predicts drinking or having negative emotions. Last, I estimate whether receiving help in the form of gifts, labor assistance, or loans correlates with drinking and bad feelings and if help softens the harmful psychological effects of illness.

Table 11.7 contains definition and descriptive statistics. Two comments about the quality of the information before presenting results. Table 11.7 shows a few brusque changes I cannot explain, such as a drop in the share of adults who borrowed money, from 12.5% in 2005 to 4.8% in 2006, or the whittling down in the percentage of adults reporting negative emotions, from 89.4% in 2006 to 39.7% the next year. In addition, the data has holes. We measured most

variables every years, but receiving labor help, gifts of goods or of money, or getting loans we measured during only 2005-2010.

Insert Table 11.7

Table 11.8 shows that adult who had been bedridden the week before the interview were 5.6 percentage points more likely to have received gifts of goods (column 1), 1.6 percentage points more likely to have receive cash credit (column 3), and 5.4 percentage points more likely to have had negative feelings the week before the interview, or to have been somber during the interview (column 6). Bedridden adults were not more likely to drink alcohol (column 5), get workers to help (column 2), or receive cash gifts (Transfers, column 3). Illness prompted specific, not across-the-board, aid[xxiii]. The weak ties between *(a)* being sick in bed and *(b)* receiving labor help or cash gifts, or drinking is understandable. Tsimane' live in a cashless world, making it hard to give alms to the sick. The way we defined it, liquor refers to beer and hard alcohol; a bedridden person was unlikely to have the money to buy either. Without cash donations and without the ability to earn money, no surprise the sick didn't drink. The positive but weak link between illness and credit agrees with what we saw earlier. Figure 11.16 showed that adults borrowed money for earthly needs, like paying for fares or buying food and drugs. I can imagine a bedridden Tsimane' asking for cash loans to cover food needs, travel to clinic, or buy drugs. Nothing odd. The positive association between being confined to bed and negative emotions is too plain to deserve an explanation.

Insert Table 11.8

What made the sick feel better? Is it others' kindness, knowing they have access to credit, or self-reliance? Table 11.9 provides hesitant answers. Getting gifts of goods (column 1) or cash (column 4), or having a helper (column 2) did not change how bedridden adults felt. The kindness of others did not assuage the psyche. Likewise, receiving credit while bedridden did nothing to make the sick feel happier (column 3). Nevertheless, having borrowed money during the past year went along with an increase of 11.5 percentage points in the likelihood of feeling bad (column 6). Only self-reliance made things better (column 5). A bedridden adult who reported having dealt with recent misfortunes alone was 4.5 percentage points more likely to feel good. Psychological autarky, aloneness, helped the psyche while loans hurt it. I would have expected the opposite, namely having a sponge of other people to fall back on or having a line of credit would lighten spirits. Maybe social props and access to loans created unspoken burdens; the perceived weight of having to repay gratitude or loans stressed the sick. Another point lies buried in Table 11.9. As discussed earlier in the book, we do not know what the market economy does to the soul of rural denizens far from towns. Column 6 suggests that market participation gauged through access to loans might damage the psyche.

Insert Table 11.9

Discussion and conclusions

I. Methods

[a] *Shortcomings*. In much of this chapter I pinpointed cardinal and less forgivable methodological flaws. Having cleared the underbrush, here I return to two common shortcomings, undercounting and inconsistencies, and draw out lessons.

We undercounted the frequency of shocks and the lone stance adults took after a shock. Frequency. Villagers told us about the most striking shocks they had without telling us about the garden-variety of shocks they had borne. We should have been more consistent and read to them from a list of commonplace shocks, striking or not, as we did in 2004-2005, to see how many they ticked off, and, once done, prompting them to tell us about other misadventure not in the list. In this way we would have been confident of having garnered data about standard mishaps from all adults. Aloneness. We asked adults about the mishaps they had experienced, but suppose the respondent was ill and to the question of what they did about the malady they said "nothing" because their spouse had sold goods to buy drugs. Since the sick person did not sell, they were telling the truth when they said "nothing"; they had withstood the malady solo, but the answer skirts the point that others in the household had stepped in to deal with the shock. The question should have been, "what shock did you experience" and the follow-up questions should have been, "what did you or anyone else in the household do about it?" Even better would have been to ask about misfortunes experienced by the whole household, like crop loss, and shocks afflicting the individual, like a broken leg, and for each problem asking what the household, as a group, had done, and what the individual (or members of the family) had done. The undercounting from our approach won't affect trends much, but will taint descriptive summaries about the number of shocks and generosity.

The second shortcoming, inconsistencies, took the form of gaps and coding irregularities. It is hard to defend not having asked about all emotions in 2007-2008. It is equally hard to justify why, when asking about feelings, we asked about only sadness and anger at non-household members in the randomized control trial on village income inequality. Especially with emotions and drinking, the coding and sometimes the questions changed between years. Some years drinking included beer and hard liquor, other years only hard liquor. Some years we asked about the number of times the adult had been angry the past week, other years we coded anger with lumpy labels like never, sometimes, often. Coding inconsistencies I partially addressed by creating binary variables, which turned coarse answers into their lowest common denominator, like *Drinking* or *Sad* for consuming any alcohol or for having felt sad, in either case regardless of how often. Summary statistics should be fine, but not the true variation behind the statistic.

[b] *Strengths*. The method to gather information was suited to capture adults' thought about what hurt them most. They were free to decide what a shock was and how many to list. The method captured well subjective diversity even when two people spoke about the same event; the wife called the loss theft, the husband predation by livestock. The method was also apt at revealing villagers' perception of the monetary cost of shocks, however muddled the estimate. For the analysis we relied on primary data from a large sample of adults, 7632 (Table 11.2A), unusual in ethnographic work.

II. Lessons: Elysium, shock types, coping, burden

Elysium.

[a] *Level*. Two thirds of adults said they had not experienced harmful shock the past year (Table 11.2B). The share of women and men unfarmed by shocks were alike (Figure 11.),

women doing a bit better than men. Compared with men, women were 5.5 percentage points less likely to report a shock and had 4.8% fewer shocks (Table 11.5). When they had a shock, most adults mentioned one shock each year (Table 11.2C), often (54%) an illness or its symptom (Table 11.2D) . Zooming in to the past week shows a complementary story. Twenty-two percent of adults had been sick in bed the past week (Table 11.8), with an average and median of 2.77 and two days confined to bed (SD = 1.76).

There is more we need to know before the statistics can speak to us more forcefully. We don't know, for instance, if the same people had shocks every year, or if we are dealing with a fresh sample of injured individuals each year. We can't say anything about recovery or the speed of recovery after a jolt[xxiv]. Nor do we know what a bedridden day means. Could they have been bedridden part of the day, but done work the rest of the time, like cutting firewood, fishing, or caretaking, as the elderly do? Or were the sick flat out in bed, unable to do daily chores?

Despite misfortunes, the whole brood of villagers were cheerful. Close to 60% smiled and laughed during interviews while 86% said they felt happy the past week. More than 50% had not been angry or felt fear the week before the interview (Figure 11.23).

[b] *Trend*. Measured by all the things that had gone wrong the past year, life was getting better. During 2005-2012, each year adults were 5.6 percentage points less likely to encounter a misadventure and had 4.9% fewer misadventures to report (Table 11.5). Perceived morbidity during the past week also improved. During 2002-2010, the number of ailments and symptoms afflicting children and adults declined by 0.6%/year. Over 2005-2012, the chances an adult would be in bed from illness did not change, the number of days confined to bed fell by 3% a year, and the number of ailments the past week contracted yearly by 2%[xxv].

Shock types
[a] *Level*. Among mishaps during the past year, poor health (54%) and deaths in the family (8%) took the lead, accounting for two-thirds of shocks (Table 11.2D, Figure 11.3). Nineteen percent of all shocks wrecked Tsimane' means of livelihood; these shocks included losses of crops and livestock, floods, and damaged or lost equipment. Social shocks less directly tied to subsistence, like a marital breakup, gossip, and the threat of encroachment by foreigners accounted for 8% of misadventures. We tend to equate adverse shocks in poor rural societies with events crippling subsistence, an assumption our data confirms, yet note how often people said gossip had harmed them. At first blush, the four percent of respondents who singled out gossip seems like a low figure, certainly next to the 62% who mentioned poor health and deaths in the family. Nevertheless, gossip overshadowed seven other shocks in frequency (e.g., loss of livestock, encroachment, lost or broken equipment), and rested a notch below floods (6.2%), an uncontested natural calamity. Clearly most shocks were material but some were of the mind. Efforts by many researchers have often gone into understanding how poor villagers worldwide try to shield themselves from unforeseen harms of nature, but how does a villager fend against the hurt from rumormongers other than by becoming a recluse? We come back to this question when discussing how Tsimane' manage shocks.

To the untrained eye, on the surface, the perceived illnesses of the past week seem mild (Figure 11.8), not the sort of things that would prompt transfers from those beyond the family to the sick, but the interpretation misses the point that, behind adults' health complaints, could lie grave maladies, like pneumonia or tuberculosis, maladies our team was unfit to diagnose. That

said, the correct medical diagnosis doesn't matter for our end, which is to see if illness, so visible to other villagers, could lift the social portcullis and stoke generosity from neighbors.

[b] *Trend*. Shocks had different trends. During 2004-2012, the chances of experiencing most shocks fell while the chances of experiencing other shocks rose (Appendix D). Of nearly a dozen shocks, the likelihood of encountering eight shocks shrank each year: Theft, crop loss, death in the family, floods, losing goods, encroachment, divorce, and miscellaneous misadventures. These improvements were offset by the rising prominence of other adversities. The chances of fire, gossip, a house collapsing, and illness rose, the last noticeably by 4.4 percentage points each year. The rise in unwellness says that, amid a trend of safer living conditions, lay the stain of more health afflictions.

How do we reconcile the growing trend of unwellness the past year with the absence or even improvement of indispositions during the past week? The two trends should have pointed the same way. They did not because of mistakes in measurement, more marked with data from weekly than yearly recalls. Morbidity data for the past week was noisier. Adults didn't recall how often they had been indisposed and, on the spot at being asked, had to figure out whether and how to report fractional bedridden days. They guessed, rounded, and did their best to answer. Answers about illnesses over the past year differed. When asking about illnesses the past year, surveyors told villagers to restrict themselves to grave illnesses, like a broken leg or a prolonged bout of diarrhea with fever. Those illnesses had to vie with deaths in the family, crop losses, or floods to make it to the file of elite annual shocks. I would hazard to guess respondents had less room to get it wrong as their gaze turned onto outstanding health complications suffered in the past year. What we cannot answer, unfortunately, is how far changes in perceived major illnesses in the past year came bloated from villagers using higher standards to define hale. To solve the riddle, we would need subjective and objective measures for the same malady, ideally from the same person, ideally over time. Such data would allow us to test if, in the early years of the study, respondents were less likely to acknowledge suffering from an objective malady than in later years.

Coping

[a] *Level*. Of 1,344 records of people who reported shocks and what they did about it, 32% (n = 428) did nothing, 68% (n = 916) did something[xxvi]. Why did so many do nothing and how do we make sense of the divers ways for coping among those who acted?

I start by showing the shocks for which villagers did nothing (Figure 11.26) and explaining why this might have been so. Villagers stood passively after a shock if the shock was small (e.g., damaged equipment), irreversible (e.g., deaths in the family), hard to remedy (e.g. gossip), or if a shock was handled better by institutions (e.g., floods). Respondents could have done nothing about an illness shock if they had a high tolerance for discomfort or a tendency to disregarded indispositions. What troubles me is the high percentage (22%; n = 97) of villagers who did nothing after a harvest loss. If they lost a morsel or if the harvest loss fell within what they had anticipated to forego at sowing time, villagers doing nothing would make sense, but if the loss was large, above their expectations, and if victims stood still, then a supine approach would show vulnerability, a conclusion that, though reasonable, nevertheless needs to be qualified. To judge the size of the at-risk population, the 97 records of people who remained still after a loss need to lie next to the 1344 records of all people slammed by shocks. Done this way, a small fraction (7%) of Tsimane' turned out to be vulnerable; most lived in a safe world.

Insert Figure 11.26

Those who took steps followed multiple paths. So far, when discussing shocks borne the past year, I examined separately shocks and coping. Now I want to fuse them and see what adults did for each shock. Figure 11.27 shows Tsimane' leaned on a patchwork of cushions to handle misadventures.   When faced with a house that burned, theft, and loss of crops or animals they did something, but alone. For marital breakups and for deaths in the family, they depended on social support, mainly family. For floods, encroachment into village lands, and for quidnuncs, they counted on institutions, as we saw when analyzing the fallout of the 2006 flood. When faced with damaged or lost equipment, they sold and took out loans to have money to replace goods. When ill and sometimes when faced with a death in the family, they fell back on a blend of safety nets; they stood unaided or drew on family, institutions, and the market, all in roughly equal amounts.

Insert Figure 11.27

What follows are speculations about why Tsimane' depended on some ways more than on others to get by specific shocks. *Alone (36%).* Of the 916 records of people who had a shock and said what they did, most (36%) managed the shock alone. Tsimane' have a strong penchant for independence that chaperones a foraging way of life and family farming. You don't find communal hunts. No communal fishing. No communal sluices to keep clean. And you don't find communal work, other than clearing paths and cleaning public gathering places before officials arrive. Once a year, they get together as a village for a festivity. Other than fleeting gatherings to quaff *chicha*, families carry out daily life unstrung to other families. Some households take self-reliance further. On purpose they relocate to the outskirts of the village or to the other bank of the river, across from the village, to avoid damages from free-range livestock of others or to have more room to enlarge their clutch of domesticated animals without bothering neighbors. Besides material reasons for choosing seclusion, these households could have gone into self-imposed exile because they were the victim of gossip, because they were humorless, lacking in the social graces valued by the fellowship of villagers. When butted by a shock, they opted to deal with the misfortune alone since they had chosen and felt comfortable with a solitary life even before the shock. *Institutions (20%).* Formal institutions were better than individuals or families at helping with large shocks like floods or shocks, like encroachment, that courts of justice were better at settling. No amount of good will from neighbors can erase the damage regional floods inflict on villages and farmlands because at those times everyone sinks together. To regain lost ground, you can't bank on neighbors or expect their goodwill to compete with pacey aid flows from well-heeled institutions like Save the Children, the Red Cross, or the Bolivian government. To face encroachment from highland immigrants, from cattle ranchers, and from loggers, Tsimane' on their own, without mediators, have sometimes straightaway defied and driven back interlopers. Over the past decades, however, Bolivia's central government has vested local institutions with the authority to settle land disputes, making it less necessary for villagers to take up arms. *Social (20%).* Families are there to help with marital breakups or with deaths in the family. Hard to think how institutions or markets could help close the rictus of those wounds. *Market economy (13%).* For shock where victims needed money to

get back on their feet, such as paying for health care or replacing lost metal tools, Tsimane' had few choices other than to sell goods or labor.

Figure 11.27 hides one message. Throughout the book we have examined the pull of the market economy, a momentous topic because autarky, once gone, will probably never return. Autarky is conventionally gauged through the makeup of income, consumption, or assets, as done in previous chapters. Figure 11.27 suggests that, besides these metrics, one could use safety nets in times of need as a telltale for an anchorite economy. By forcing people to make hard choices in times of trouble, shocks become a crucible to see how far victims can count on the market to weather the storm. When faced with shocks, Tsimane' handled the shock by themselves or with the help of family in 56% of cases. In 40% of cases they relied on formal institutions and the market economy. When ill, they used money to buy medicines and pay for fares in 28% of cases (Appendix C), and in the savings trial (2011-2012) when we asked adults directly if they had used cash to manage the aftermath of a shock, 32% said they had. Thus, though highly self-reliant when facing shocks, Tsimane' drew on the outside world for assistance. How long do you have to be outside the market to be called autarkic?

The figures just mentioned underestimate the amount of autarky because they leave out the many, many Tsimane' (n = 5113), accounting for 67% of the sample (Table 11.2A), who had no mishap to report and who, in theory, might have had slight interactions with the outside world to manage shocks. One could go further in stressing Tsimane' reclusiveness. In quotidian life, Tsimane' seldom relied on villagers or outsiders; a mere 15% got gifts (Figure 11.9), six percent loans (Figure 11.15), four percent received labor help (Figure 11.12), one percent cash donations (Figure 11.20).

[b] *Trends*. Table 11.5 (column 3) shows that, from 2005 until 2010, the probability an adult would do something after a shock rose by 2.3% a year. What lay behind the increase? Turns out that of the five ways of managing shocks ─ *Alone, Social, Institutions, Market, Other* ─ the chances of doing something rose only for one way, *Alone*. Each year, the chances of taking lone steps after a misfortune increased yearly by four percent. At the same time, the likelihood of relying on markets declined by six percent a year. The probability of using other paths, such as institutions or social supports, did not change[xxvii]. These statistics suggest a trend toward more autarky ─ more self-reliance, less engagement with the market ─ but they could also be somewhat misleading, as villagers who said they had acted alone could have meant that, without help, they had sold goods, worked for wages, or fetched a loan. I say somewhat on purpose because Table 11.8 also shows a trend toward less sociality. After controlling for sex and health, the probability of receiving gifts and labor help declined by 1.5 and 0.5 percentage points each year.

Burden of shocks and value of transfers
[a] *Levels*. Burden of shocks. Shocks exacted a financial cost and a psychological burden on their casualties. The mean and median cost of a shock to an adult, 832 and 362 *bolivianos* (Figure 11.5), pro-rated over a year, was in the range of $0.02 to $0.05 per day, a pittance next to a daily *per capita* income of ~$2. The psychological burden had more bite. Bedridden people had a 5.4 percentage-point higher chance of feeling bad (Table 11.8, column 6). The small perceived financial cost of a shock and its modest psychological burden could explain why so many adults said they had no collisions to report, did nothing about shocks, and managed shocks alone. Value of transfers. Transfers were infrequent, small expressed in *per capita* monetary

terms, and did not lift the spirit of bedridden adults (Table 11.9, columns 1-4). However, the monetary worth of each transfer was not small. A household got an average of $34 in aid after the flood of 2006. Each gift received was worth $2, each loan $4, each cash donation $7. On the rare occasions when they received labor help, they got help, on average, every other day in a week. Bedridden villagers were more likely to receive gifts and credit than able-bodied villagers (Table 11.8, columns 1, 3). These fragments hint at a social landscape sprinkled with selective evergetism among coequals; sizable aid packages from known individuals, mostly Tsimane', arrived not every day but at critical times.

[b] *Trends*. The real financial cost of a shock declined by the untrustworthy amount of 4.8% per year (Table 11.5, column 4), untrustworthy because of mistakes around cost estimates. Nevertheless, the psychological burden of shocks decreased yearly. The likelihood of having negative emotions shrank by 3.2 percentage points every year for everyone (Table 11.8; column 6); bedridden and fit adults enjoyed the same rate of improvement[xxviii].

Conclusions. I come back to the questions posed at the chapter's outset to assess how far we have gone in answering them.
 Vulnerability. Still pictures and trends show Tsimane' generally live in a safe world that is getting safer and safer. No empyreum, their world was free of grievous misadventures. Most villagers didn't have much to complain, most shocks had modest costs. Life was getting better over time. The chances of reporting a misadventure, of being bedridden, and of having negative emotions declined every year; the number of misadventures endured declined every year as well. A benign and predictable habitat, a stoic chine, and a society free of drug addiction, crime, unemployment, slums, and homelessness fuse to explain why shocks were so uncommon.
 *Coping*. When bumped by a shock, most villagers did nothing or acted alone to soften the blow. The few who took measures to redress the shock' sequel drew on several methods; some went to the market, some dependent on the goodwill of neighbors. For weighty problems they waited for outside institutions to rescue them. The penchant for self-reliance bordering on solipsism I trace back to a mode of livelihood that puts the household at the center of foraging and farming without much need to band together with neighbors. Strong families, weak communities. Opportune institutional aid after natural disasters and routine government payments for old-age pensions, for school attendance, and for prenatal care (Chapters 4 and 7) etiolate feelings of communion with the rest of the world, further bolstering households' proclivity to act independently.
 Effect of shocks. Most shocks were not costly, but health shocks were. Seventy-seven percent of the sample confessed they had not been sick in bed the past week, but the 23% who had said they had been unable to work for 2-3 days, a large amount of lost income however defined. Unsurprisingly, the ill were more likely to have negative emotions, but did not take to drinking. No informal self-insurance within or across village ─ gifts, cash donations, labor aid ─ helped the ill feel happier. In fact, having borrowed money harmed the psyche.

Two final points to conclude the chapter. A flat, uniform topography and a hitherto predictable clime have had implications not only for the social organization of Tsimane' subsistence but also for their views of the future. Nature could partially explain why, among Tsimane', regret is rare, impulsivity common, and, more germane to this chapter, why they are unlikely to take precautionary action before debacles[xxix]. Worldwide climate upheaval of course

might change the improvident mindset that has worked so far. Second, we think of poor rural societies unlinked to the market economy as vulnerable. This might not be true, but if it were, could one improve wellbeing by providing smart help? Outside institutions have stepped in to remedy health shocks; they already provide advice, drugs, and medical treatments. Ditto for floods. What remains unknown is whether recipes associated with the market economy such as bank loans, monetary savings in boxes or in banks, or crop insurance ─ to name some of the most obvious ones ─ would soften shocks' havoc. I hazard to guess these recipes might be premature for the average Tsimane' because, for the recipes to work, the economy should be churning, more monetized, the individual less autarkic. What are churls going to put in a saving account if most live in a cashless world? The question highlights the perhaps too obvious but easily forgotten point that the context has to be right before recipes can work.

# Fig. 11.1. Share of adults experiencing a shock in past year, by study & sex
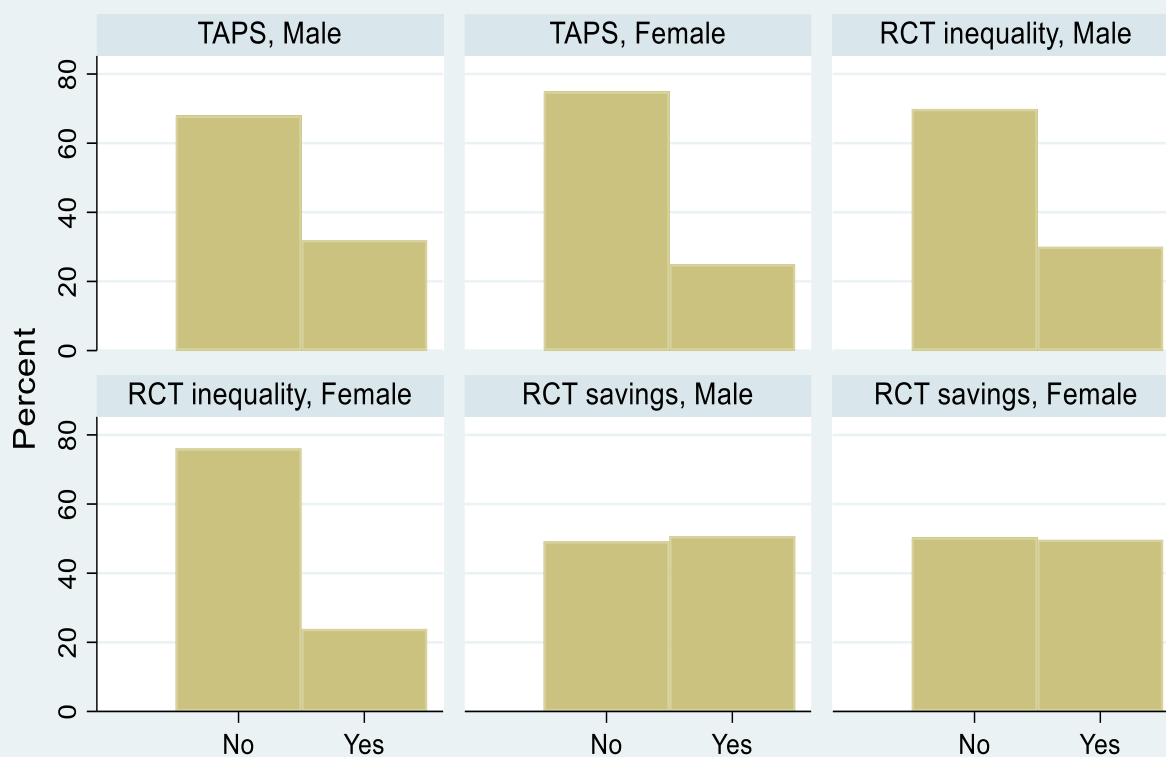
Shock coded as one if adult reported any shock in past year and zero otherwise. Study and years: [1] TAPS (2004-2010), [2] RCT inequality (2008), [3] RCT savings (2011-2012). Total sample =7632; sample includes one yearly observation for each adult.

Fig. 11.2. Number of shocks experienced by adults in past year:
By study and total
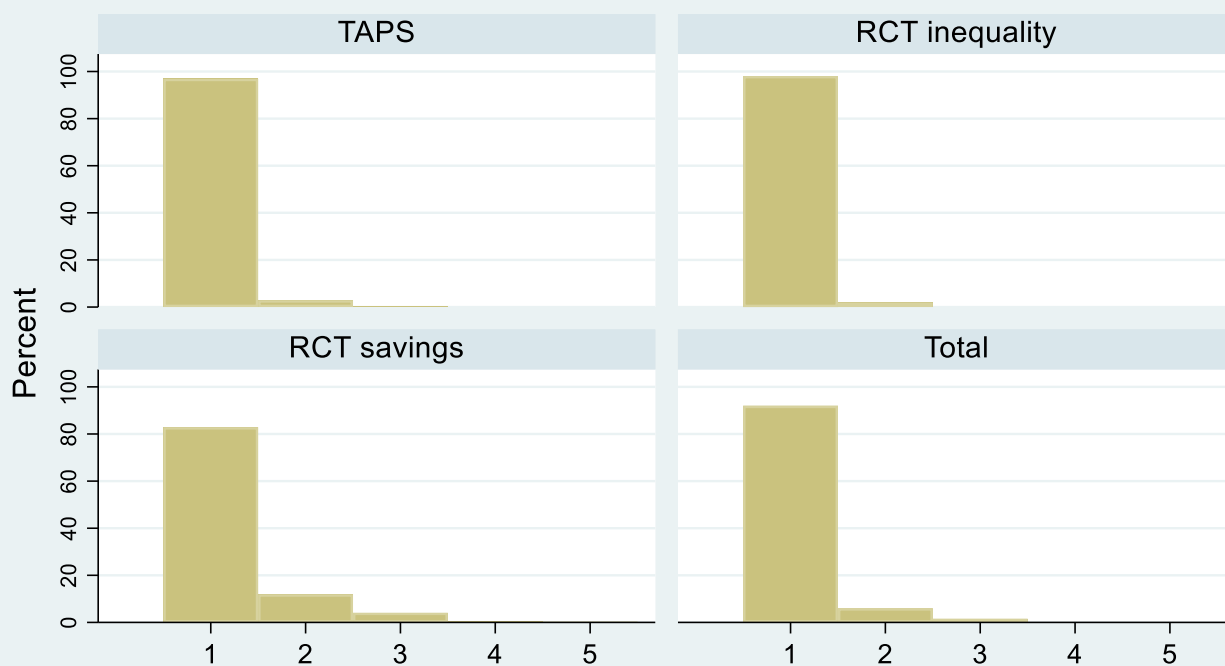
Sample has one yearly observation for each adult reporting a shock. N=2547. Mean=1. SD=0.4. Study and years in sample: [1] TAPS (2004-2010), [2] RCT inequality (2008), [3] RCT savings (2011-2012).

## Fig. 11.3. Shocks experienced by adults in past year
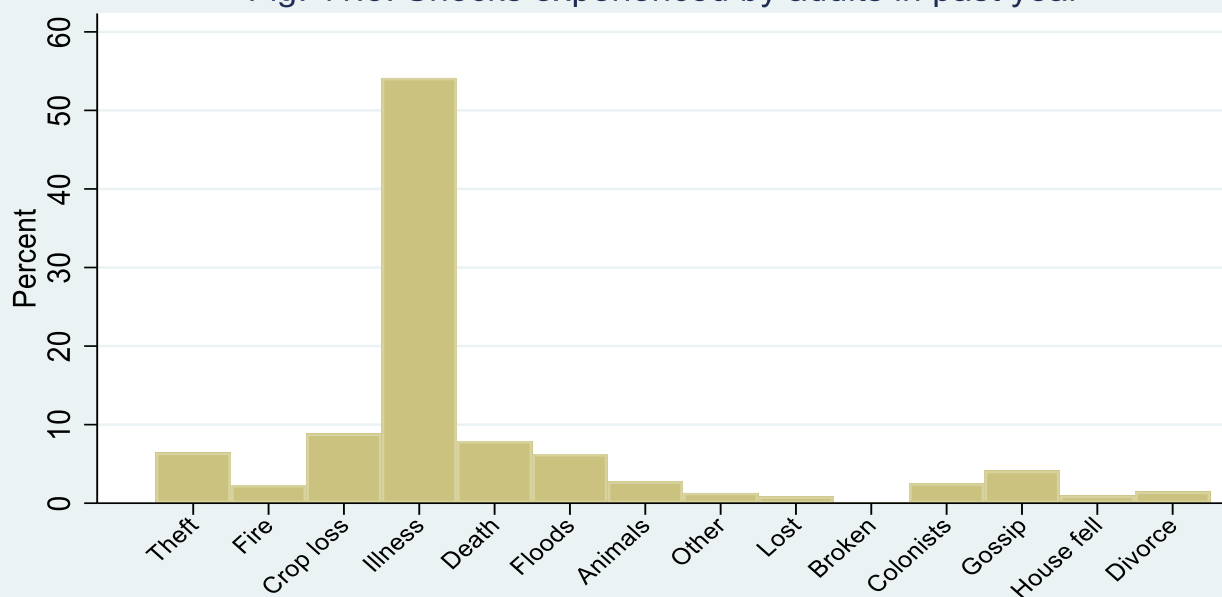
All studies (2 RCTs and TAPS) and both sexes included but only if person experienced a shock. Observations are shocks = 2815; a person could have several shocks/year. Animals = death of animals. Broken = equipment or tools broken. Lost = good lost. Colonist = encroachment by highland homesteaders. Divorce = any marital breakup.

## Fig. 11.4a. Coping by adults who had a shock in past year: Disaggregated
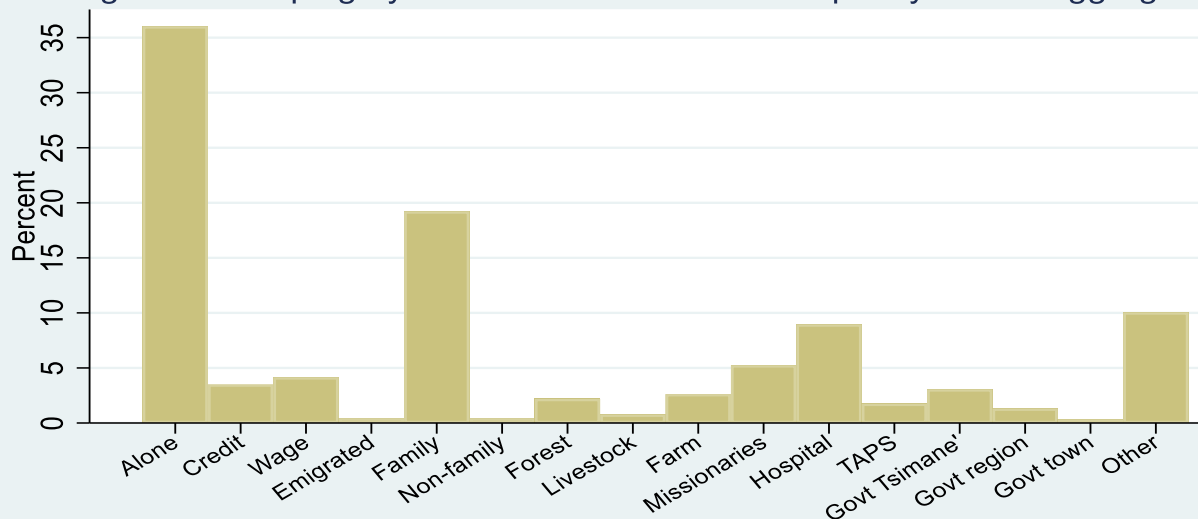
Sample = TAPS 2005-2010 + inequality RCT (2008); excludes people who said they did nothing to cope with shock. N = 916. Wage = wage labor. Emigrated = left village & returned by the time of survey. Forest, livestock, & farm refer to sale of livestock or crops (forest or farm). Govt Tsimane' = Tsimane' Council. Govt region = prefectura, corregimiento. Govt town = alcaldia' [town hall].

## Fig. 11.4b. Coping by adults who had a shock in past year: Aggregated
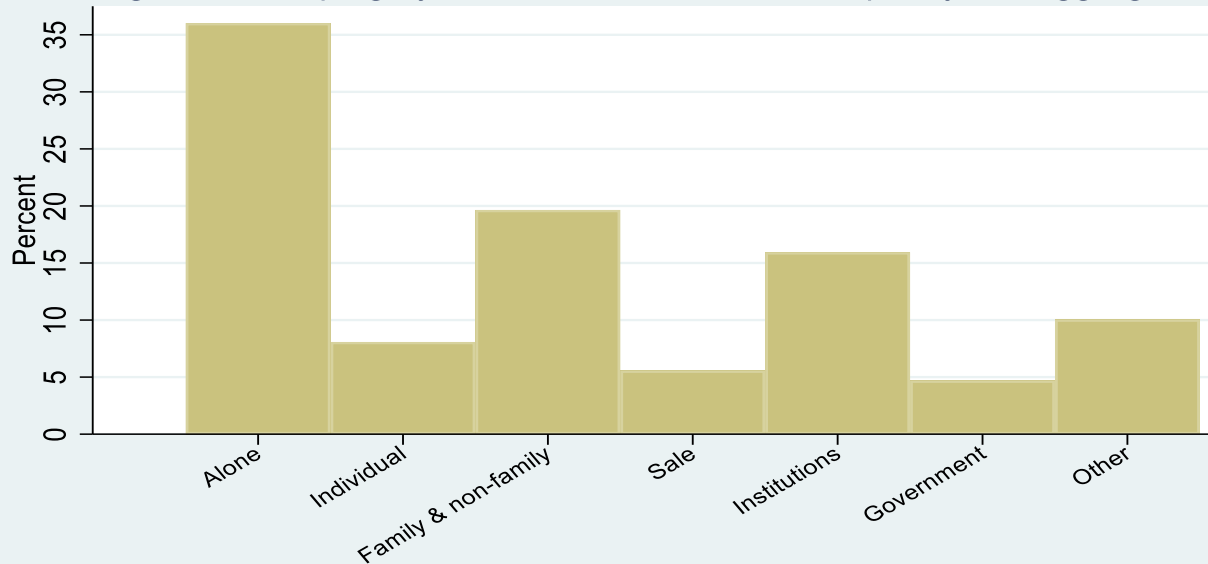
Same notes and sample as Fig. 11.4a. Except for Alone and Other, bins from Fig. 11.4a have been grouped as follows for Fig. 11.4b: Individual = credit, wage labor, emigration; Sale = forest, livestock, farm; Institutions = Missionaries, hospital, TAPS. Govt = Tsimane', regional, town.

Fig. 11.4c. Coping by adults who had a shock in past year:
Comparison between TAPS and RCT on inequality for common year (2008)
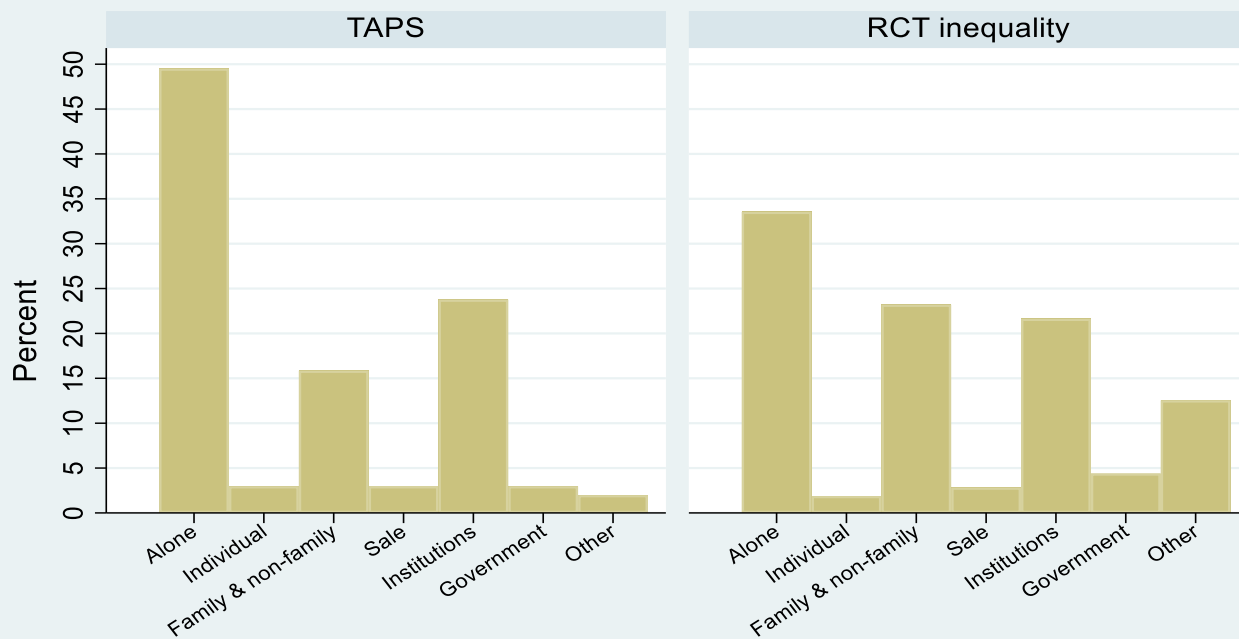
Same notes as Figure 11.4b. Sample size: TAPS=101. RCT inequality=319.

Fig.11.5. Yearly real cost of shocks per household, 2005-2010: TAPS and RCT on inequality (RCT-I, 2008) compared
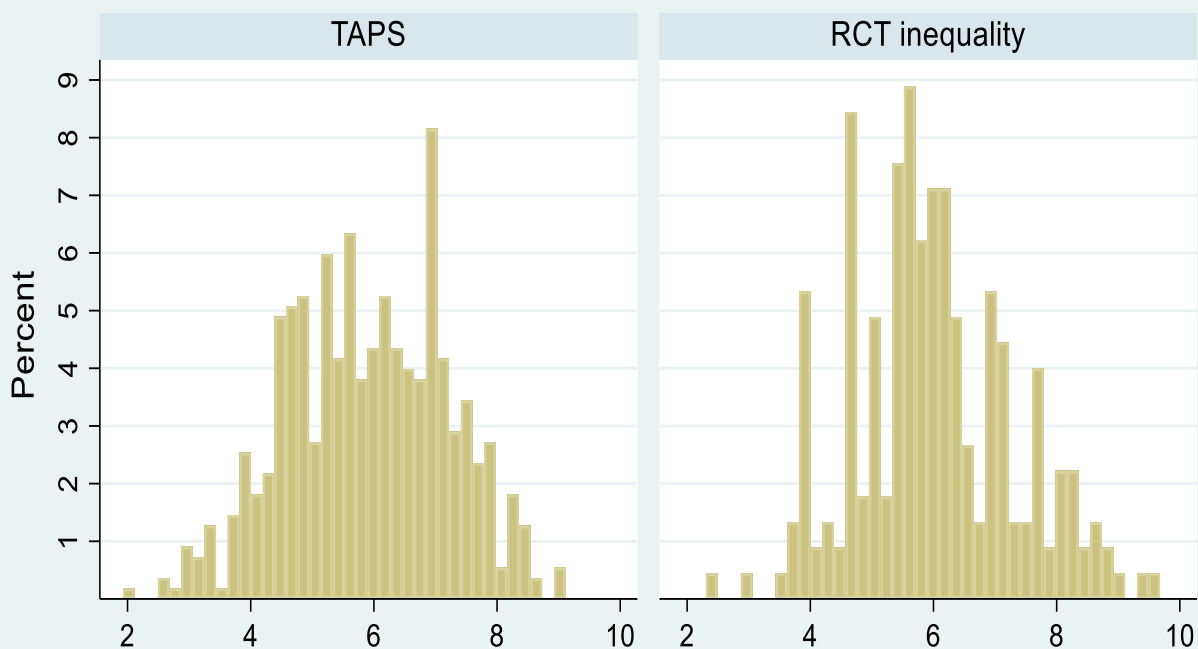
Individuals' cost estimates are aggregated to the household and transformed with natural logs. Sample excludes 113 households with shocks but costs = 0, which happened when villager had shock but gave no cost estimate, got divorced, or when shock = others gossiping about self. 20 bolivianos/day imputed for every day lost to illness. Total sample for households with shocks and costs>0 = 777; for these households mean yearly shock value = 832 real bolivianos [SD = 1293]. Mean: TAPS = 780, RCT-I = 960; p value of difference = 0.139. Nominal costs deflated with Bolivia's yearly Consumer Price Index.

Fig. 11.6a. Aid items received by households due to 2006 flood
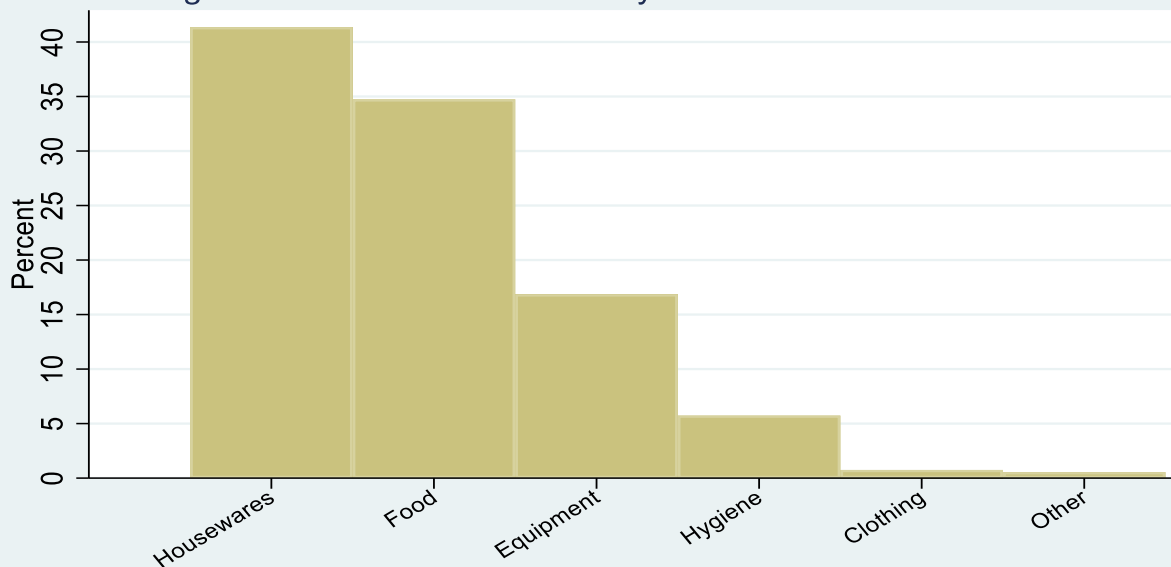
TAPS 2006. Total number of aid items received = 1465; unique items (no repeats) = 50. Example of main items in bins: Housewares (kitchenware, mosquito bed net, blankets, buckets), Food (cooking oil, flour, sugar, rice), Equipment (cutlass, shovel), Hygiene (soap, towel, toothbrush & toothpaste).

Fig. 11.6b. Bolivianos of aid received per household in 2006 due to flood
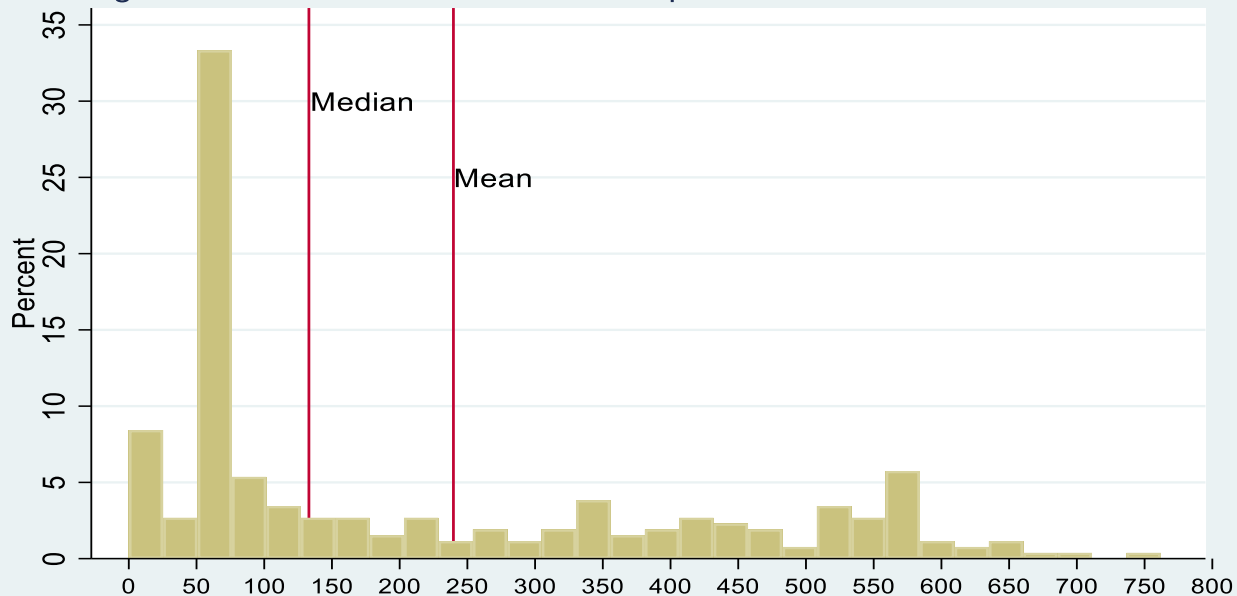
Total sample of households = 261, of which 20 received no aid. For households that got aid: mean value = 239 bolivianos, median = 133, standard deviation = 200. Values are in nominal bolivianos.

Fig. 11.6c. Institutional suppliers of aid for the 2016 flood: Number of items given
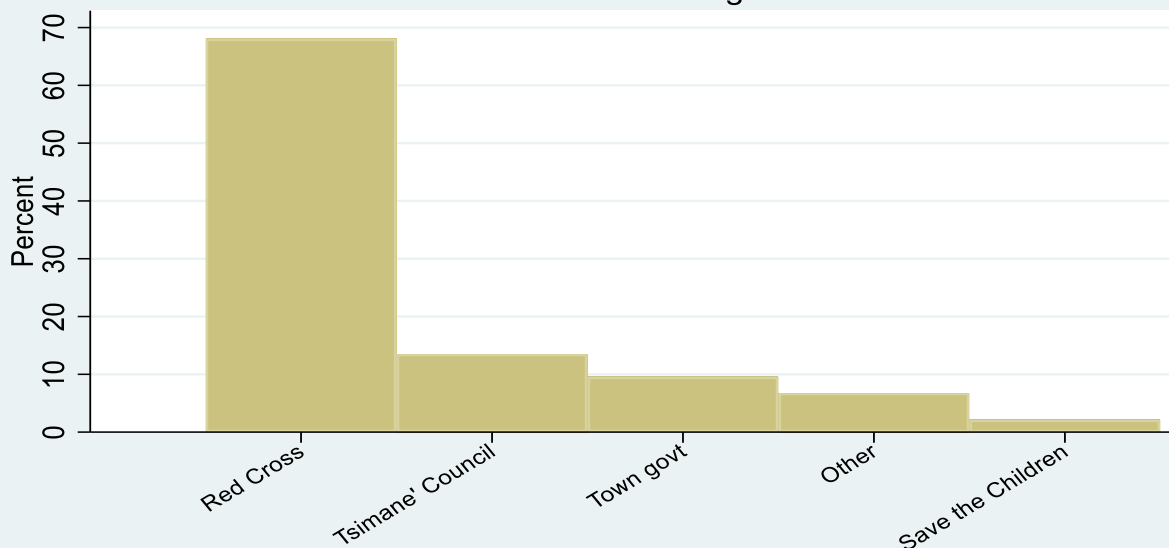
TAPS 2006. Total number of items given = 1465. Other = missionaries, a cacao project, Cuban medics, regional (e.g., prefectura) and central governments, and 2 items from unknown suppliers.

Fig. 11.6d. Share of monetary aid value for 2006 flood by institutions

78%

9%

6%

6%

1%

Red Cross

Tsimane' Council

Town govt

Other

Save the Children
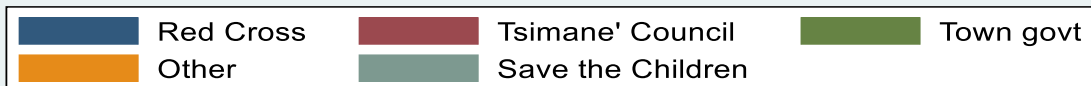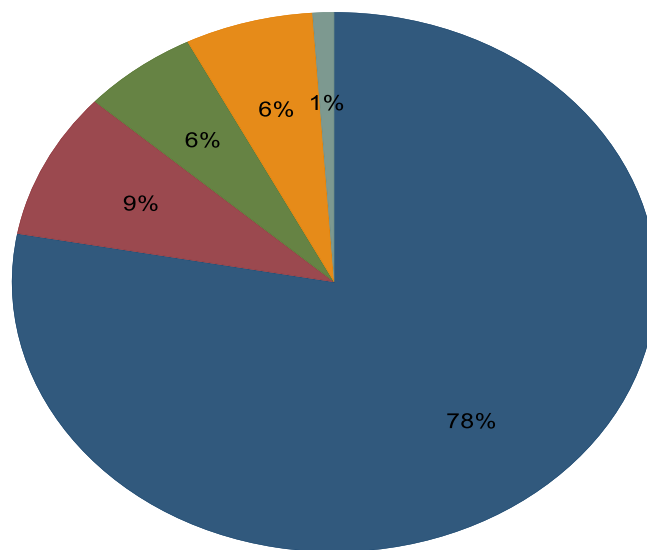
Total nominal cash value of all insitutional aid = 57766 bolivianos.

Fig. 11.7. % coping with shocks 2011-2012 by use of cash
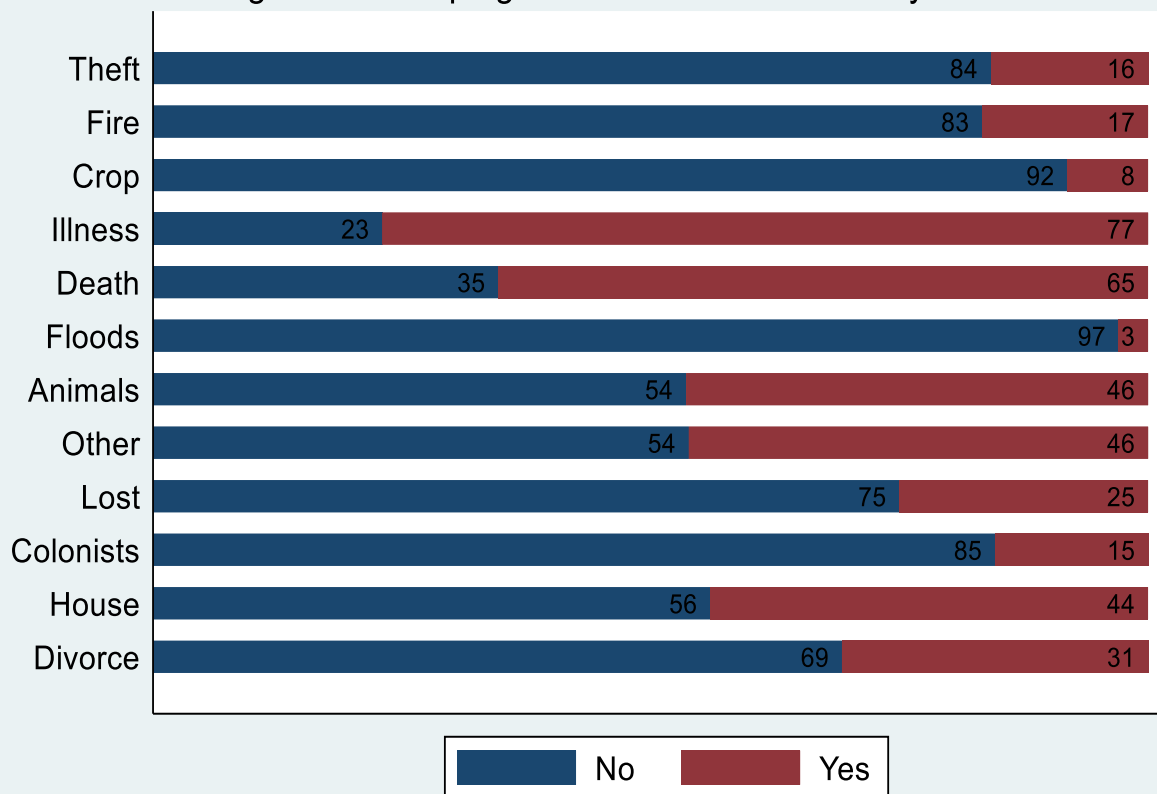
Data from savings trial. N = 1120. Same definitions as Fig. 11.3 but excludes
Gossip and Broken (n=1). House = house fell; Crop = crop loss.

Fig. 11.8. Common morbidities of bed-ridden Tsimane' in percentages
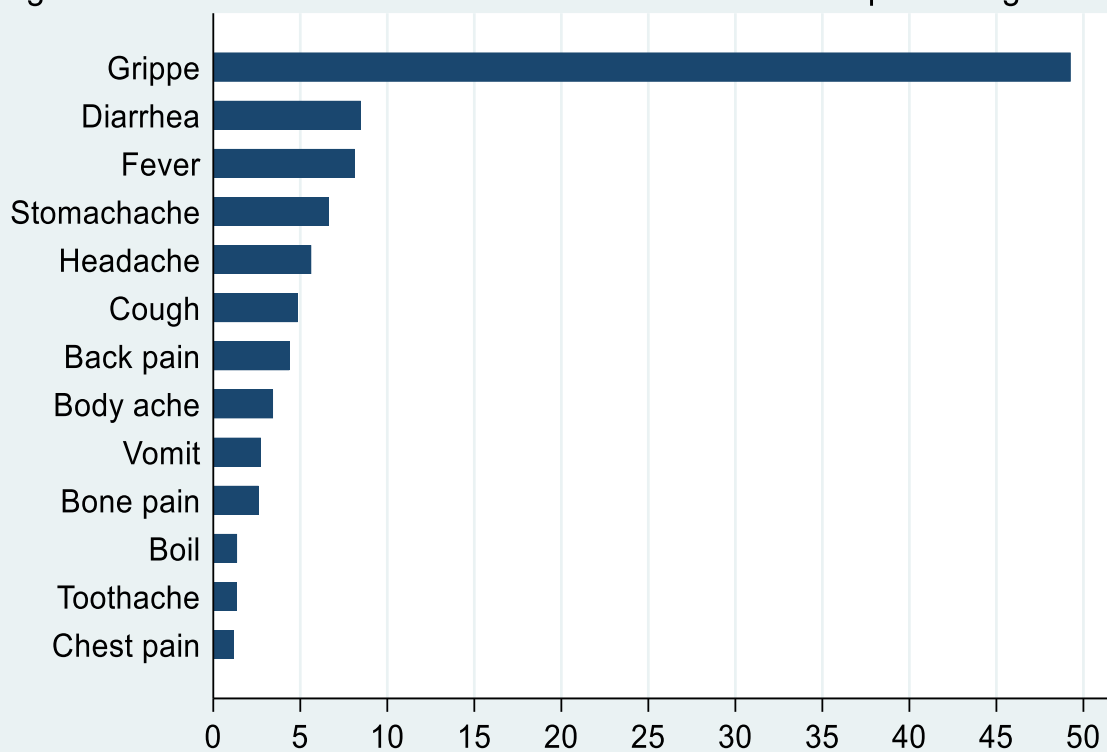
Data from TAPS (2002-2010) and inequality trial (2008). Obs = 3729 with repeats; unique number of participants = 3339 children and adults. Morbidities with <1% of observations excluded.

Fig. 11.9. Gifts received by adults in past week in percentages
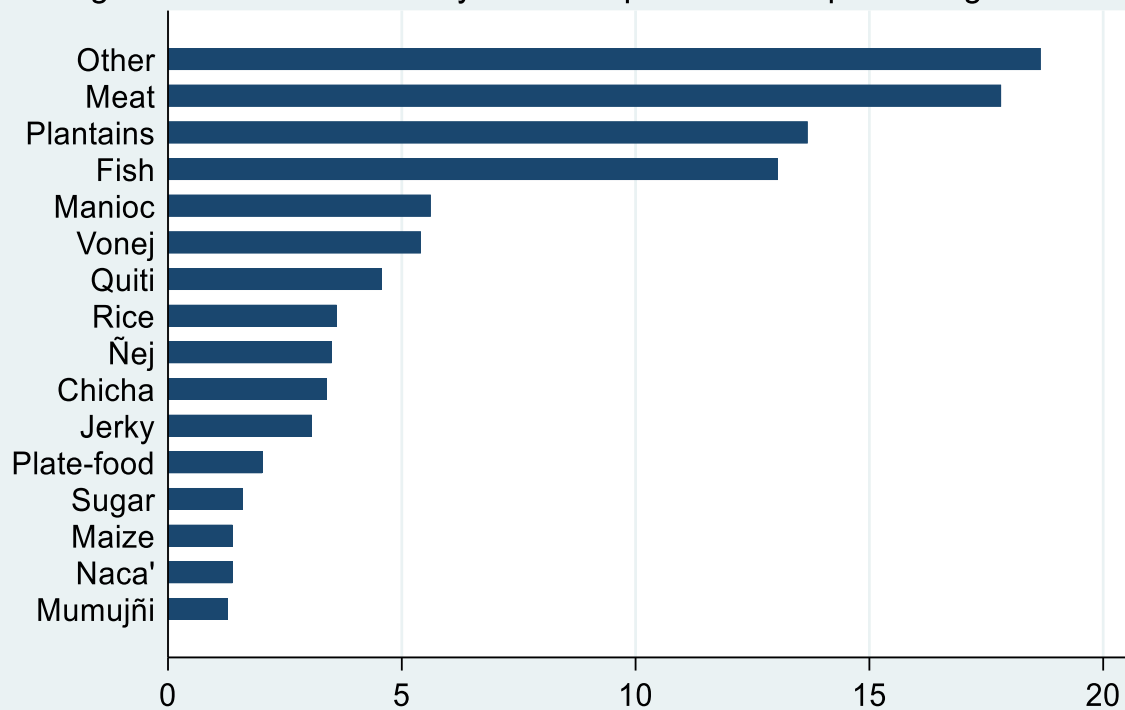
Data from TAPS (2005-2010) and inequality trial (2008). 5209 people in dataset of whom 821 got gifts. Sample of observations for graph (n=943) excludes people who didn't receive a gift. Other=gifts with <1% of observations. Game=Quiti, Ñej, Naca', Mumujñi. Fish=all fish except for Vonej (included apart).

Fig. 11.10. Value of gifts received the past week: 2005-2010
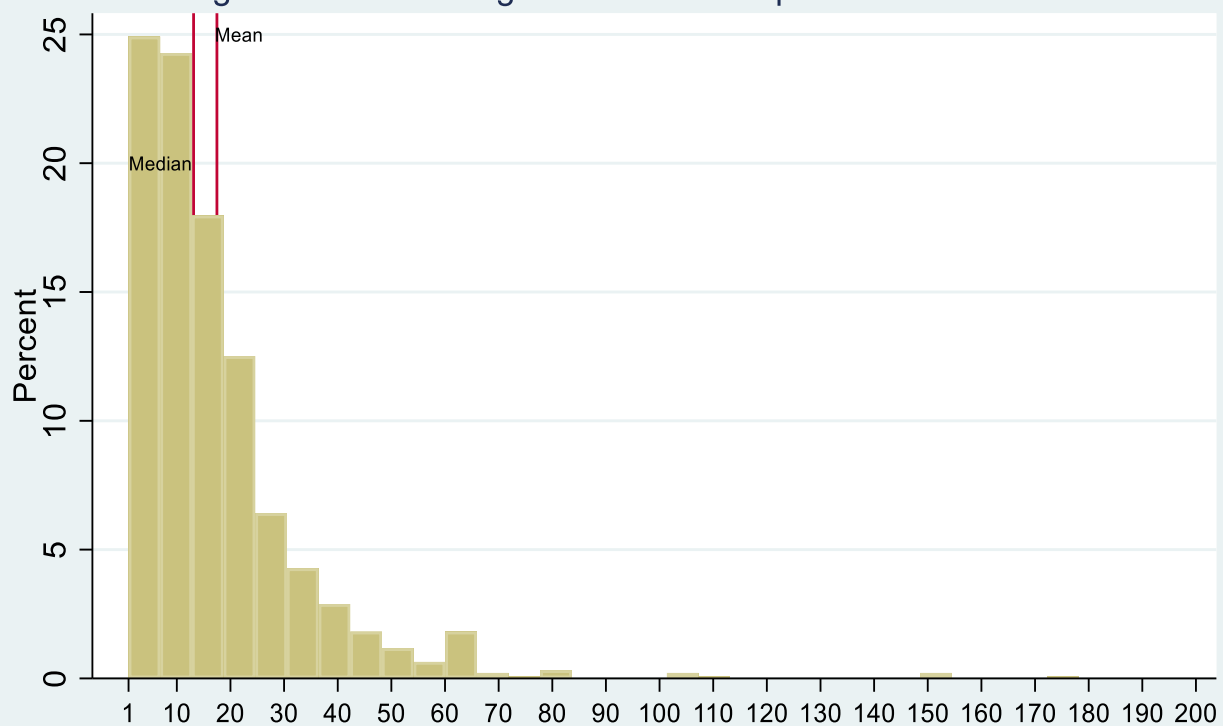
Data from TAPS (2005-2010) and inequality trial (2008).Total number of gifts = 935, received by 814 people. The mean, standard deviation (SD), and median value of gifts were 17 (mean), 13 (median), and 16 (SD). Values are in real bolivianos.

Fig. 11.11. Source of gifts received in past week in percentages

Data from TAPS (2005-2010) and inequality trial (2008). N for graph = 935 gifts with identified gift givers which were received by 821people. 'Another village' refers to a Tsimane' from another village. Napo = mestizo from the lowlands.

Fig. 11.12. Labor help received by adults in past week in percentages

Category	
Farming	
Community	
Fish	
House	
Other	
Firewood	
Canoe	
Hunt	
Cook	
Utensils	
Errands	

0   10   20   30   40   50   60   70   80   90
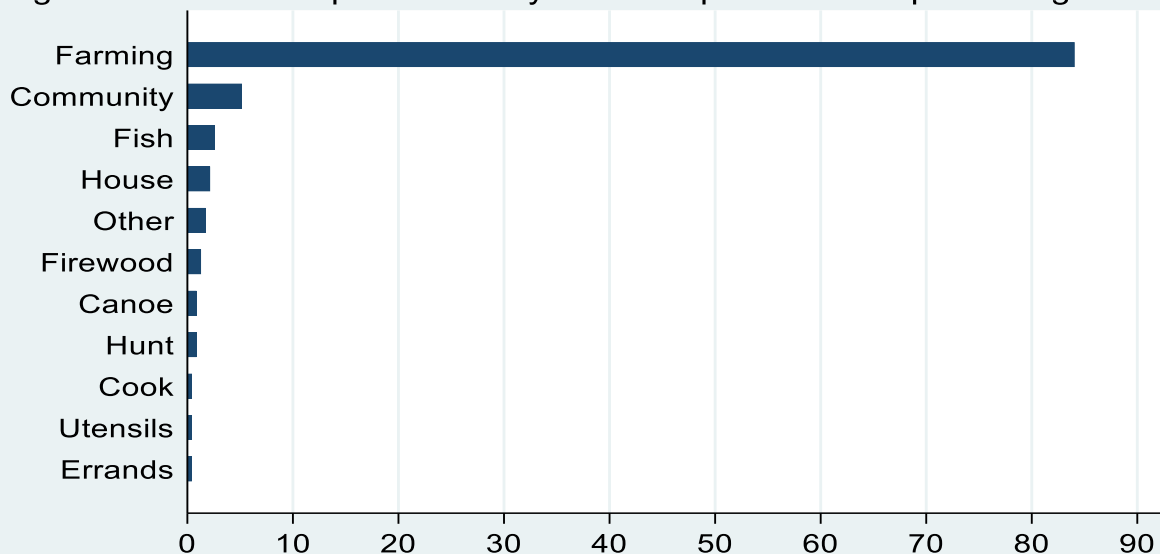
Data from TAPS (2005-2010) and inequality trial (2008). 5211 people in dataset of whom 228 got help. Sample of observations for graph (n=232) excludes people who didn't get help. Canoe, house, and utensils = others helped subject make these goods. Community = communal work. Firewood = others helped subject bring firewood. Errand = others bought on behalf of subject.

Fig. 11.13. Person-days of labor help received the past week: 2005-2010
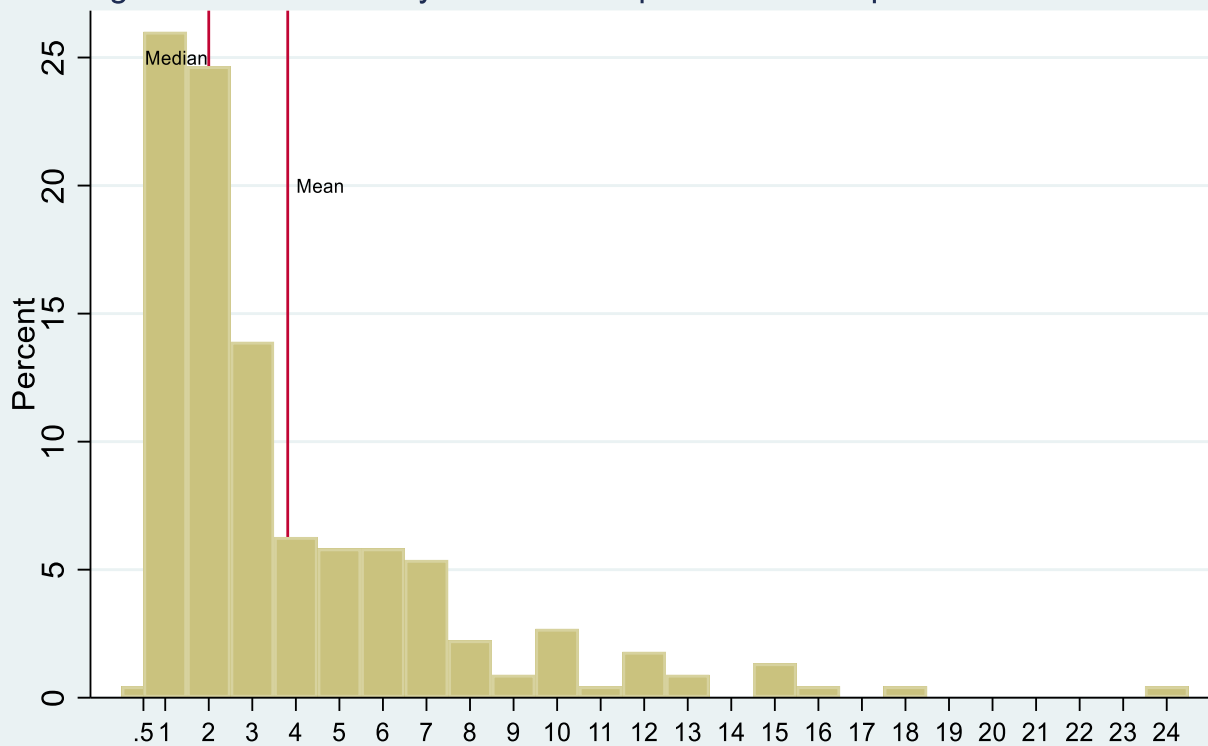
Data from TAPS (2005-2010) and inequality trial (2008). Total number of observations = 223; help received by 219 people. Standard deviation = 3. Graph includes only people who received labor help

Fig. 11.14. Source of labor help received in past week in percentages

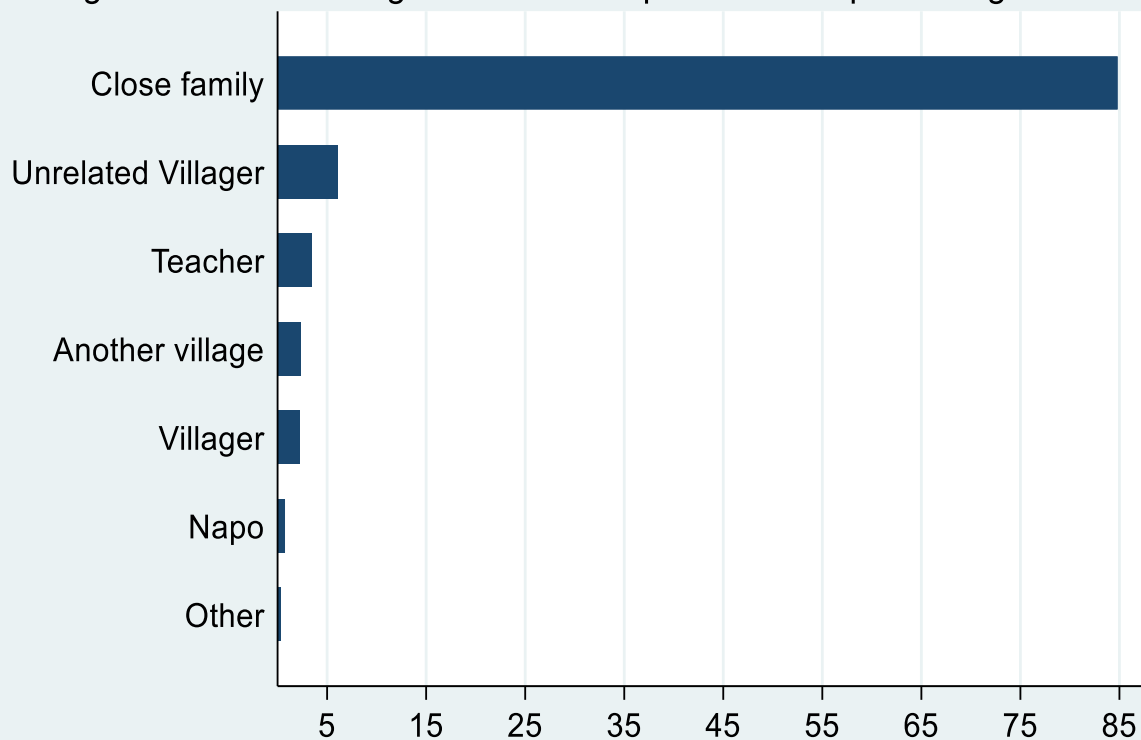Fig. 11.15. Money lenders in past week in percentages

Data from TAPS (2002-2010) and inequality trial (2008). 7105 people in dataset of whom 475 got loans. Sample of observations for graph (n=481) excludes people who didn't get a loan. Napo = Spanish-speaking White lowlander. Healer = a local, non-Tsimane' traditional healer. TAPS =Tsimane' Amazonian Panel Study.

Fig. 11.16. Reasons for borrowing money the past week in percentages
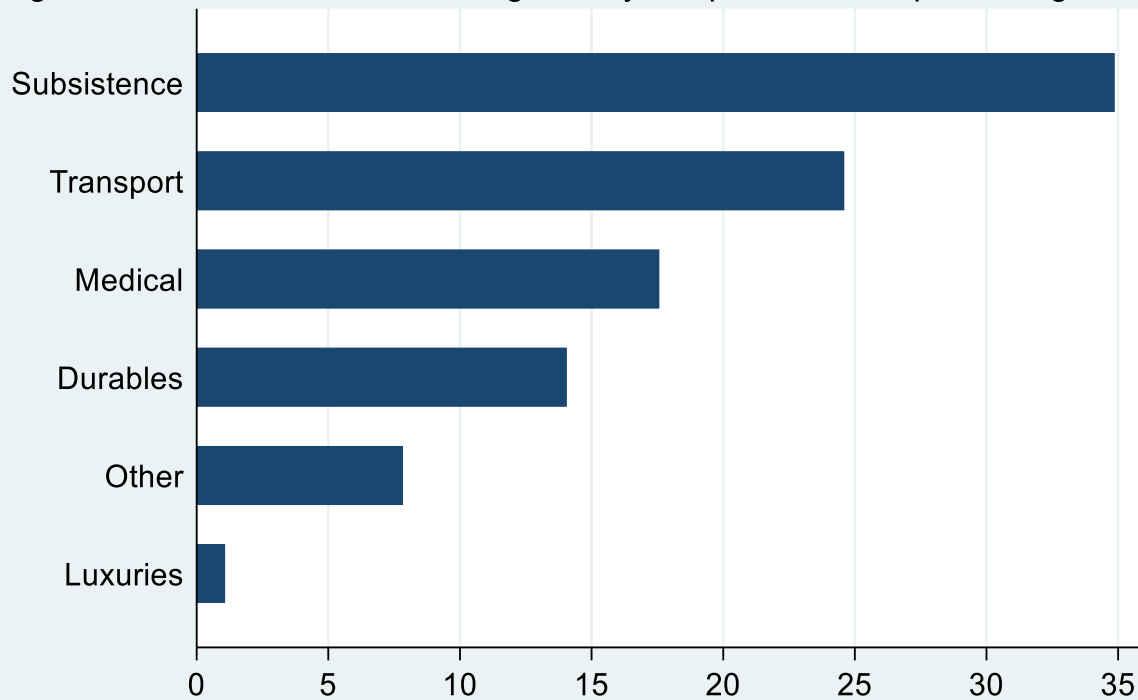
Data from TAPS (2005-2010) and inequality trial (2008). 7105 people in dataset of whom 366 reported reason for getting a loan. Sample of observations for graph (n=370) excludes people who didn't get a loan. Durables and luxuries refer to buying these types of goods.

Fig. 11.17. Value of loans received the past week: 2002-2010
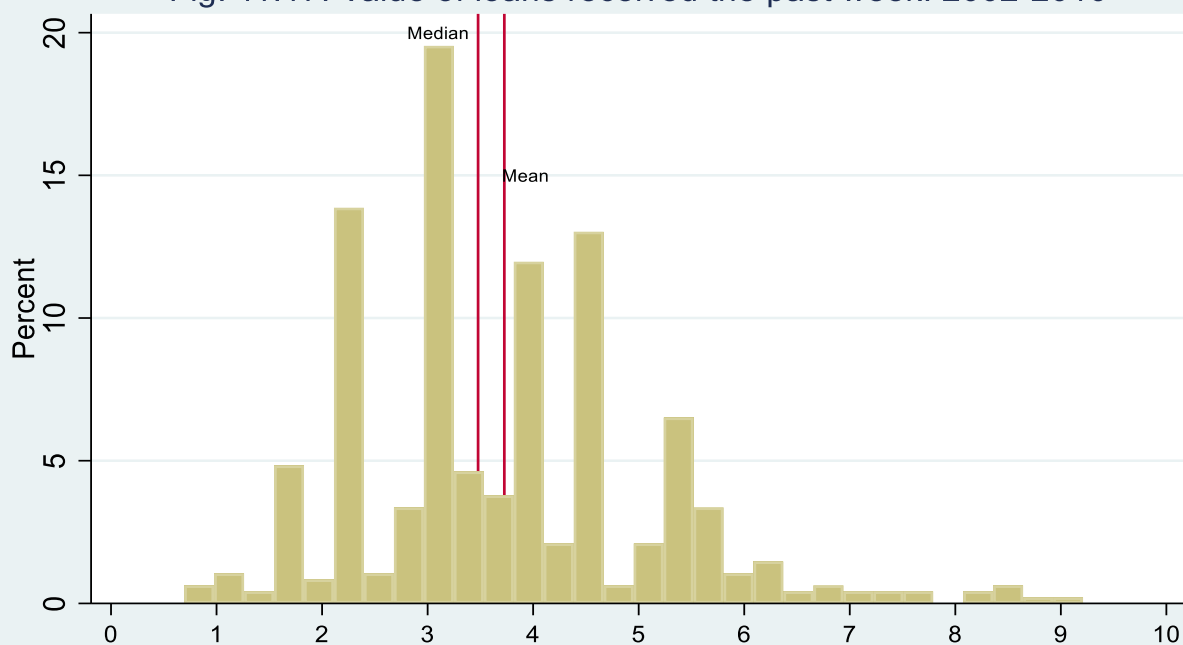
Data from TAPS (2002-2010) and inequality trial (2008). Value of loans received by 476 people. The mean, median, and standard deviation (SD) nominal value of loans were 196 (mean), 32 (median), and 790 (SD). Values in histogram are in natural logarithms.

Fig. 11.18. Share who would cope alone with an emergency
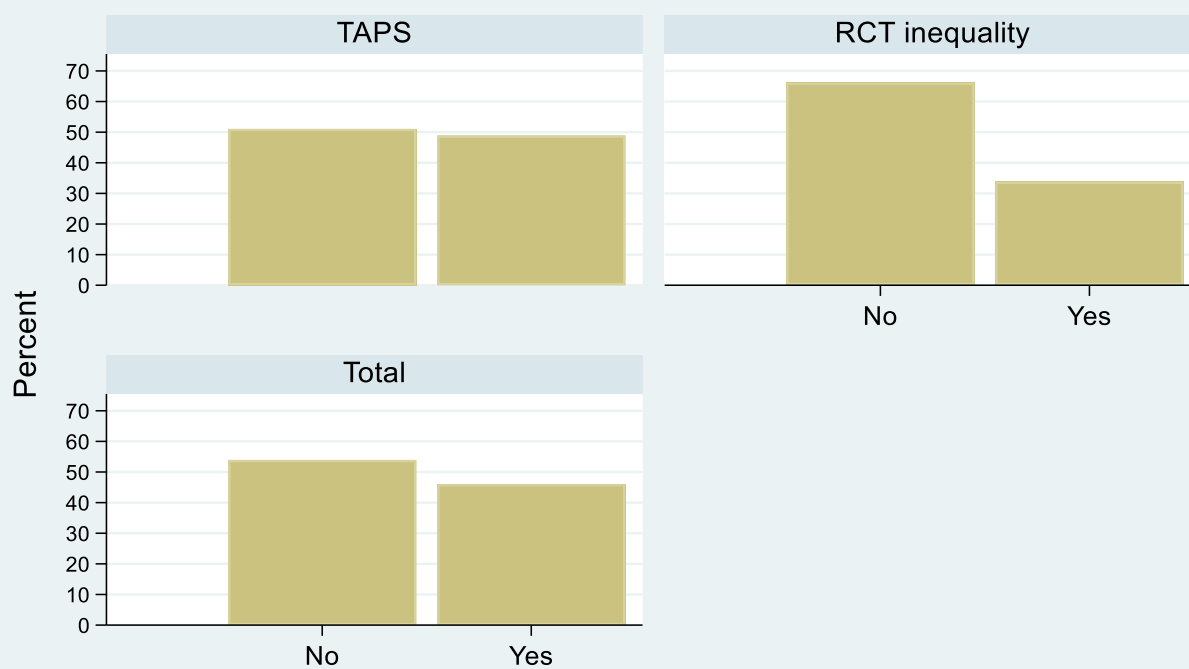
Data from TAPS (2002-2010) and inequality trial (2008). Sample = 7077 observations (TAPS=5735; RCT=1342). Observations include one record per adult each year. Alone = 1 if person would do nothing or deal alone. Appendix A has details of how the variable Alone was constructed.

Fig. 11.19. What would you do in an emergency if you needed 100 bolivianos (%)?
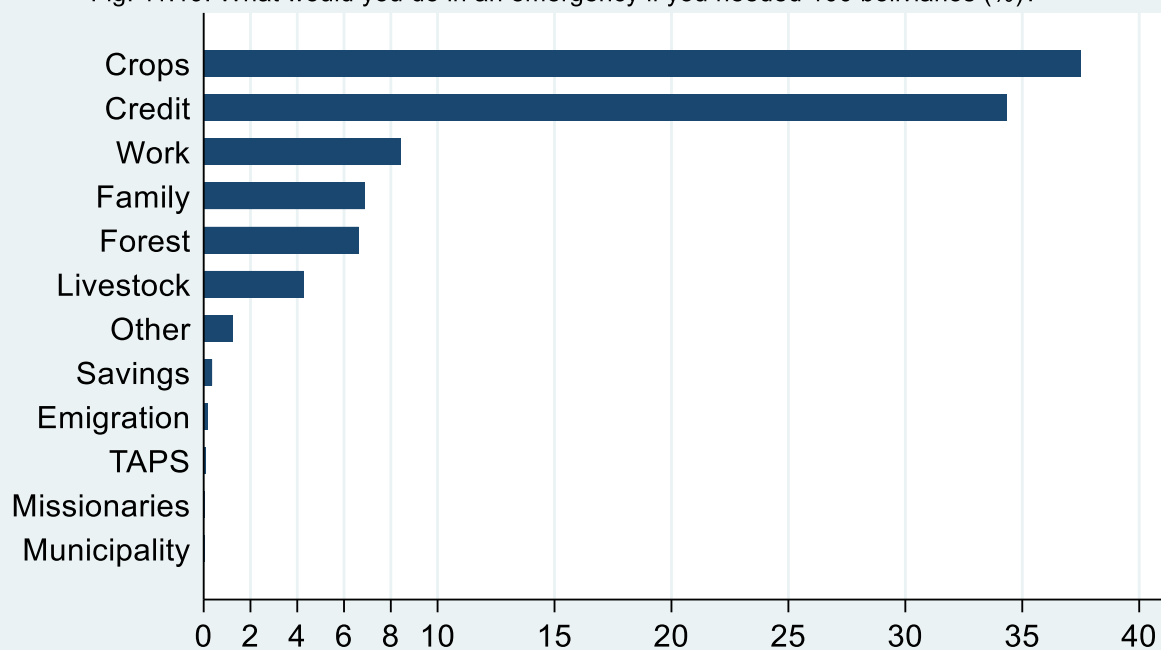
Data from TAPS (2006-2010) and inequality trial (2008). Total observations (4516) includes those
who said they wouldn't do anything (1471). Sample size for graph (3045 observations) is restricted to those
who said they could do something. Observations include one record per adult each year. Forest, livestock,
& crops = sales of forest products, livestock, and farm crops. Emigration = leave village. Responses of
 'Alone' were recoded as wouldn't do anything.

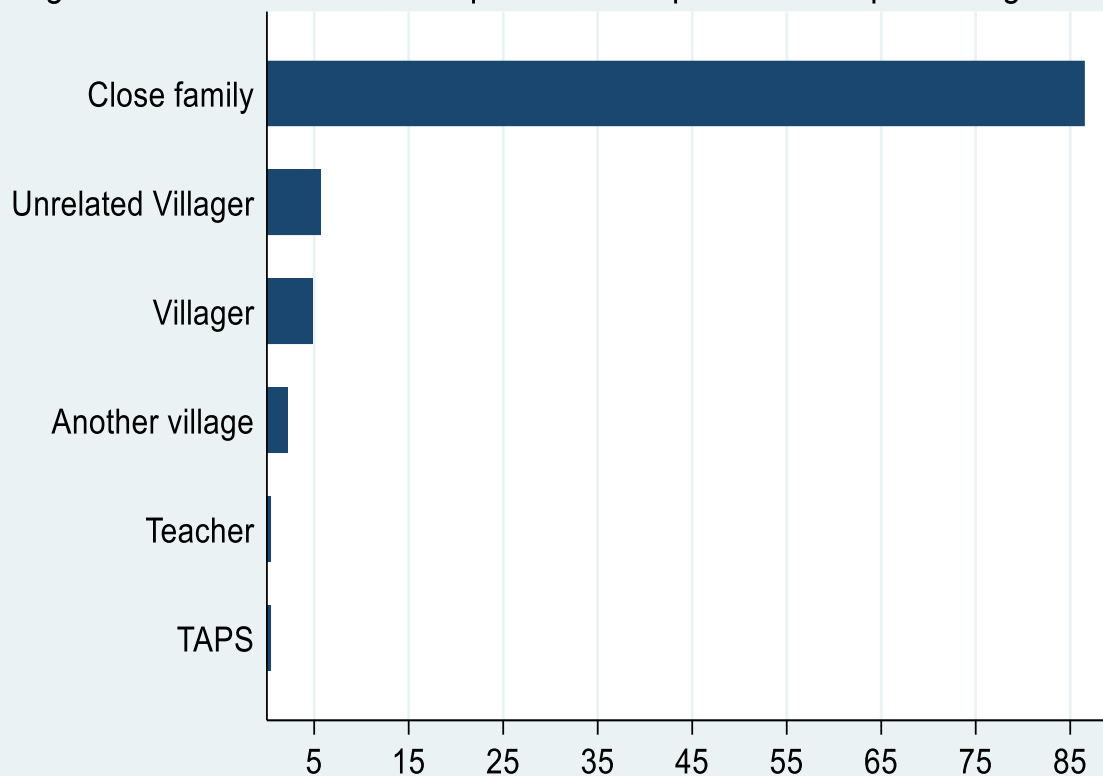## Fig. 11.20. Identity of entity giving cash gift (%)

Data from TAPS (2005-2010) and inequality trial (2008). 5023 people in dataset of whom 60 got cash gift. Sample of observations for graph (n=64) excludes people who didn't get cash gift. Napo = Spanish-speaking White lowlander. TAPS = Tsimane' Amazonian Panel Study. Data = all gifts of cash received in past week from private sources (excludes government transfers).

Fig. 11.21. Reasons or end-uses of cash gift received (%)
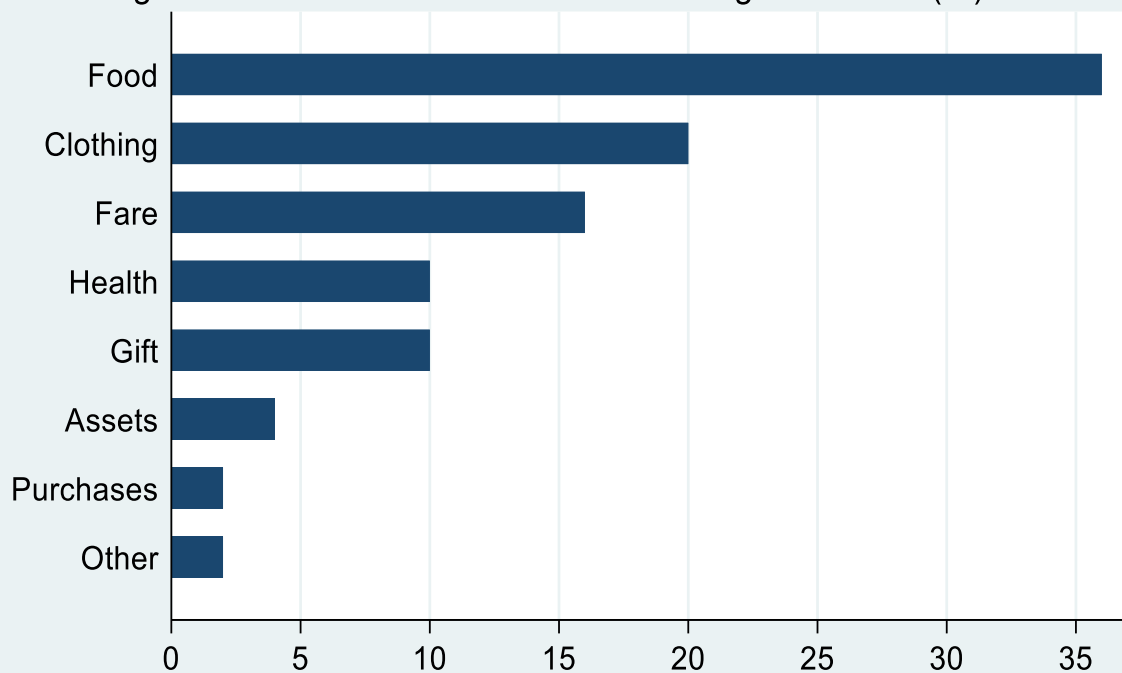
Data from TAPS (2005-2010) and inequality trial (2008). 5023 people in dataset of whom 60 reported getting a cash gift in past week, and 50 gave a reason for the gift. Sample for graph = 50. Data refers to all gifts of cash received from private sources (excludes government transfers). Assets = purchase of tools and animals. Purchases = school supplies, alcohol, official documents. Gift = subjects mentioned kindness as a reason for the gift.

Fig. 11.22. Value of cash gifts received the past two months: 2005-2010
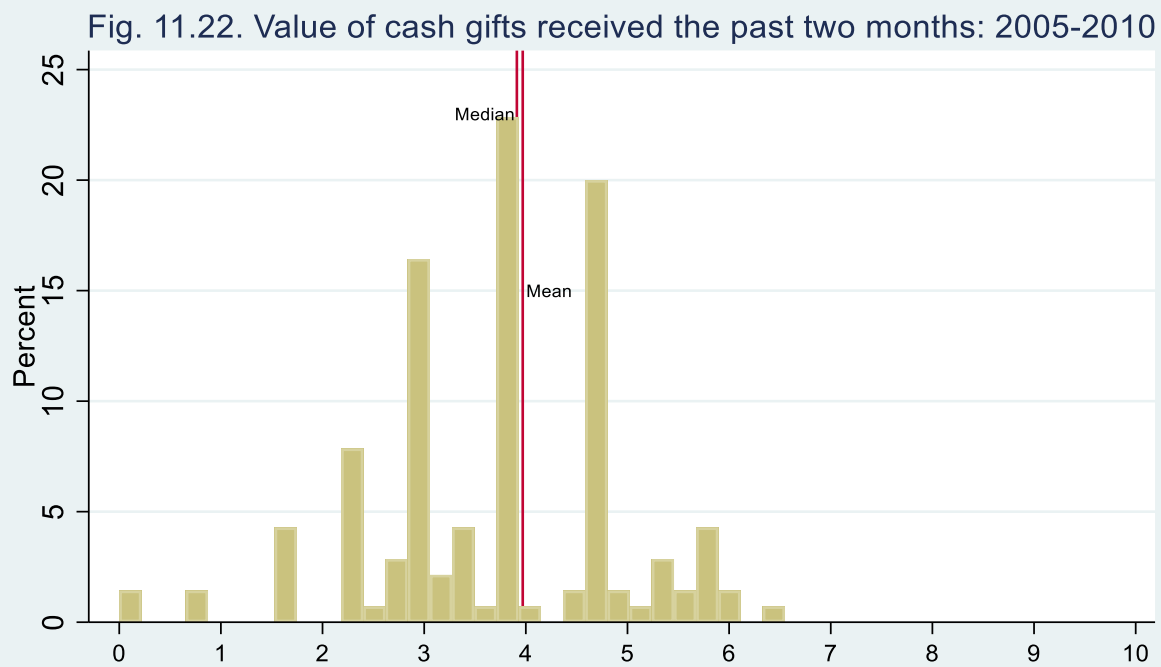
Data from TAPS (2005-2010) and inequality trial (2008). Value of cash gifts received by 140 people. The mean, median, and standard deviation (SD) nominal value of gifts were 81 (mean), 50 (median), and 105 (SD) bolivianos. In histogram, nominal values are shown in natural logarithms. Histogram includes 157 observations.

Fig. 11.23. Self-reported feelings in past week & observed smiles (%): 2002-2010
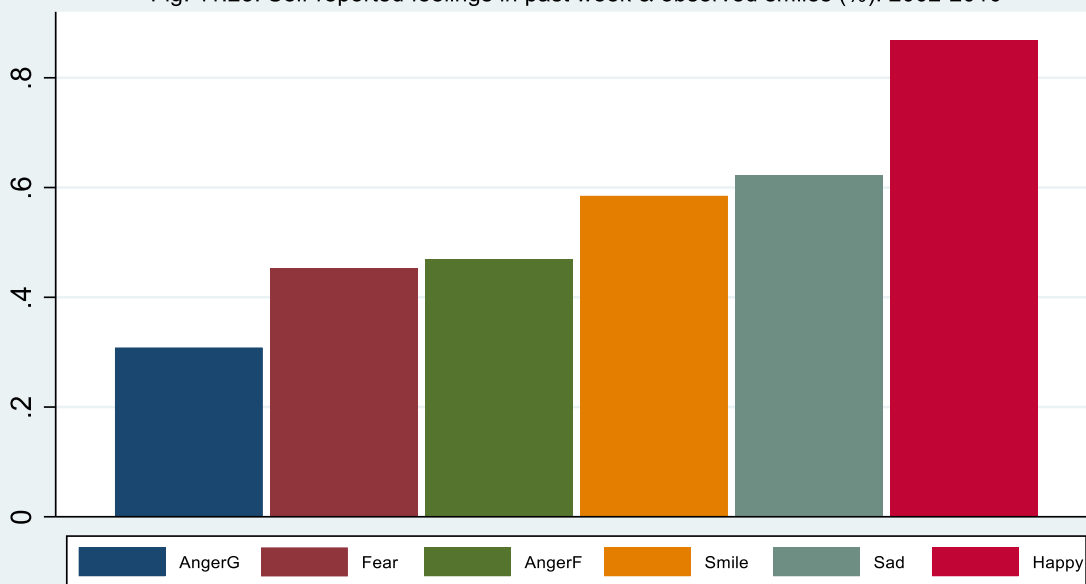
Bins show % of sample of adults in TAPS (2002-2010) and baseline of RCT (2008) reporting having felt sad, happy, fear, anger at family (AngerF) and non-family members (AngerG). Smile coded by surveyor during interview; 1 = subject smiled or laughed frequently, 0=never smiled or only smiled. Sample size: AngerG = 5712, Fear = 4351, AngerF = 5712, Smile = 6880, Sad = 5709, Happy = 4351. Data includes one yearly record/person. Data on feelings not collected in 2007-2008 in TAPS and only anger in general and sadness collected in baseline of RCT. Smiles coded every year in both studies.

Fig. 11.24. Respondent's mirth during interview as coded by surveyors (%): 2002-2010
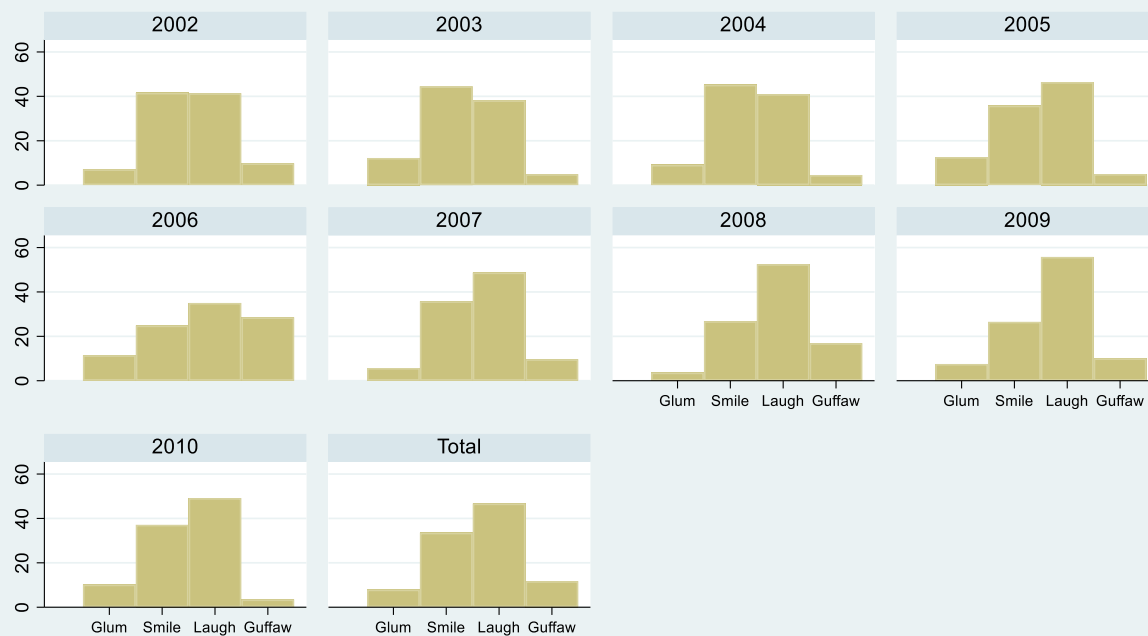
Data includes TAPS 2002-2010 + baseline (2008) of inequality RCT. Sample size = 6880 observations. Observations include one yearly record/person. Glum = person did not smile or laugh, Smile = only smile Laugh = laughed several times, Guffaw = laughed loudly several times.

Fig. 11.25. % of adults who consumed alcohol in past week: 2002-2011

Year	No	Yes
2002	78	22
2003	78	22
2004	76	24
2005	73	27
2006	76	24
2007	77	23
2008	76	24
2009	82	18
2010	78	22
2011	76	24
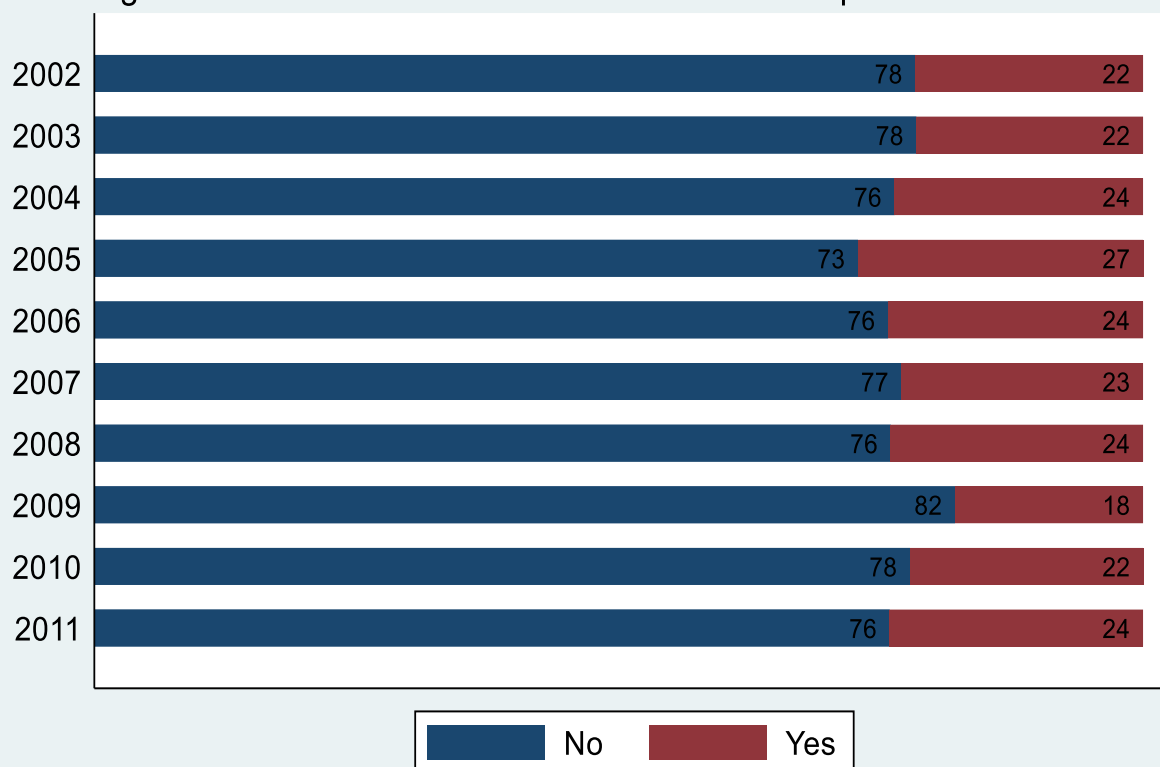
Data from i) TAPS (2002-2010), ii) baseline (2008) of inequality RCT, and iii) baseline (2011) of savings RCT. Observations = 8134 (1 record/person/year). Data refers to self-reported drinking of hard liquor and beer.

Fig. 11.26. Shocks for which adults reported doing nothing (%)
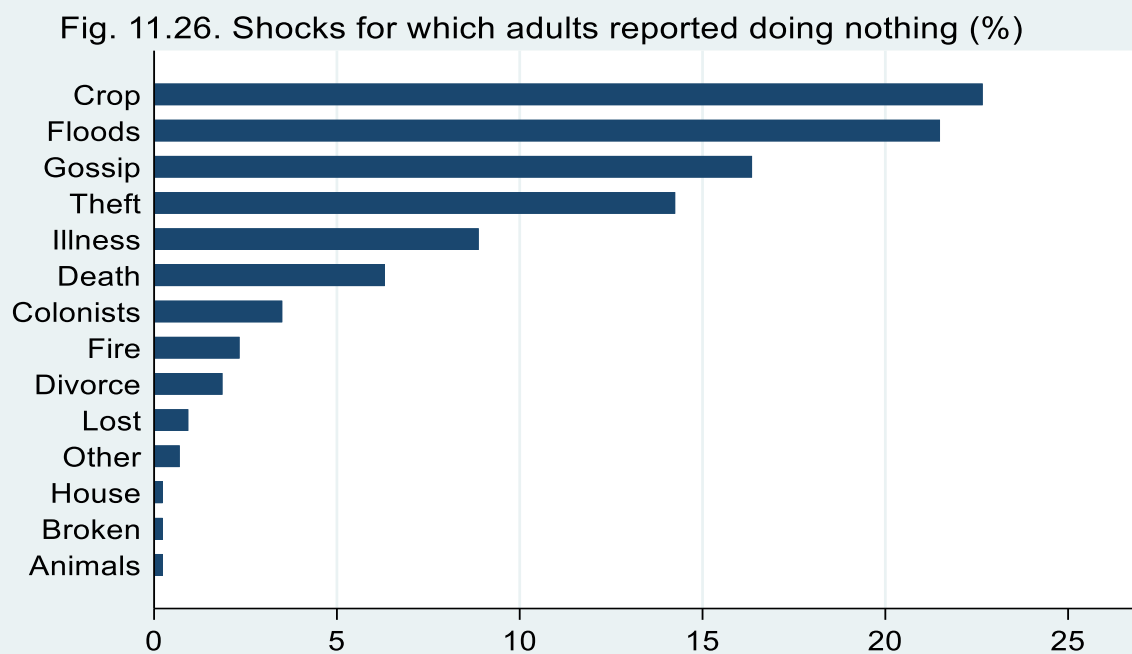
Data from TAPS (2005-2010) and inequality trial (2008). Obs = 1344 of whom 428 did nothing. Graph includes only the 428 observations of people who did nothing after a shock. Same definitions as Fig. 11.3. House = house fell. Crop = crop loss.

Fig. 11.27. Ways of coping with shocks (%)

	Alone	Social	Institutions	Market	Other
Theft	46	17	4	17	17
Fire	70	30			
Crop	57	10	5	14	14
Illness	36	19	21	14	9
Death	35	30	11	15	9
Floods	10		70		20
Animals	67				33
Other	40	13	33		13
Lost	25	25		38	13
Colonists	16	8	56	4	16
Gossip	19	5	43		33
House					100
Divorce	25	38			38
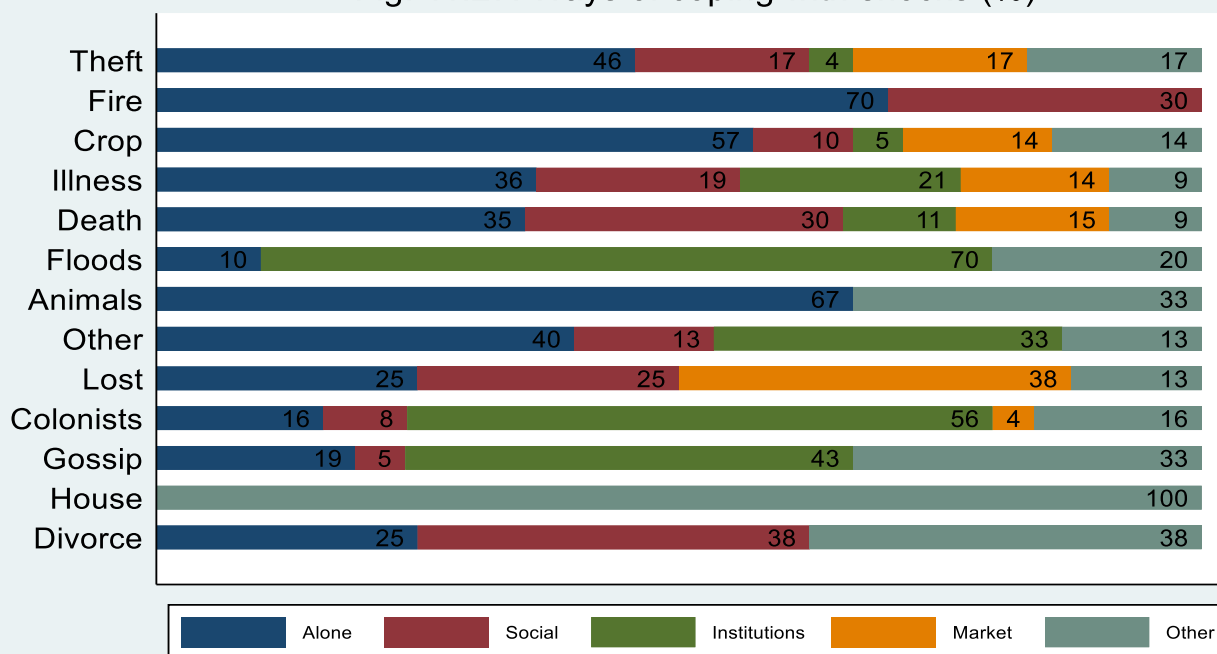
Data from TAPS (2005-2010) and inequality trial (2008). Obs = 1344 of whom 916 did something. Graph includes only people who had a shock and did something. Same definitions as Fig. 11.3 & 11.26.
Social = family & non-family help. Institutions = Tsimane' Council, governments, missionaries, hospital, TAPS
Market = Sale of farm crops, forest goods, livestock; wage labor; credit. Other = Emigration, miscellany.

Table 11.1. Traits of datasets to study the outcomes of Chapter 11: *[a]* Shocks the past year and *[b]* illness, transfers received (gifts and labor help, credit, remittances [transfers or gifts of cash]), feelings, and drinking the past seven days

Recall Period	Dataset and years /a/: Core (TAPS)	Additional	Comments
Yearly shocks			
Year	2005-2010		2006 = Has additional data on damages from 2006 flood
		2004 TAPS	Only data on shock type collected; none on cost
		2011 RCT	Saving trials has data on type of shock and cash received or used from savings box; no data on other coping ways. No data on costs of shocks
		2012 RCT	
		2008 RCT	Has same variables as TAPS 2005-2010, coded in same way
Illness			
Week	2002-2010		
		2008 RCT	Has data on illness type and bedridden days, but no data on days ill
Gifts and labor help			
Week	2005-2010		2006 = Additional data on migration and help gotten due to 2006 flood
			2005 = Help expressed as # persons/week instead of person-days/week
		2008 RCT	Has same variables as TAPS 2005-2010, coded in same way
Credit			
Week	2002-2010		2002-2004 dataset does not ask why they obtained credit; question on use of credit for emergency coded inconsistently (Appendix A)
		2008 RCT	Has same variables as TAPS 2005-2010, coded in same way
Remittances [Transfers or gifts of cash]			
Week	2005-2010		2005 = recall period is for total of past 2 weeks; not broken up between past 7 days and past 8-14 days. Has data for transfers in past 3-8 weeks
		2008 RCT	Only data for remittances received in past 7 days.
Feelings			
Week	2002-2006 2009-2010		2007: only data on smiles collected
			2008: only data on smiles collected
			Coding of answers varied between years
		2008 RCT	Dataset has information on only sadness, smiles, and anger at non-family
Drinking			
Week	2002-2010		2002-2004: only alcohol consumption
			2005-2010: alcohol and beer consumption
		2011 RCT	Alcohol and beer consumption
		2008 RCT	Alcohol and beer consumption

Table 11.1. Traits of datasets to study the outcomes of Chapter 11: *[a]* Shocks the past year and *[b]* illness, transfers received (gifts and labor help, credit, remittances [transfers or gifts of cash]), feelings, and drinking the past seven days - continued

Notes:

/a/ Core includes the 14 villages of the Tsimane' Amazonian Panel Study (TAPS) for the years indicated; 13 villages followed continuously every year and one additional village to study attrition was surveyed during two years (2005-2006). Additional data comes from the baseline of the randomized-controlled trial on inequality in village income (2008)(40 villages)(RCT-I), baseline and end-line of RCT on savings (2011-2012)(61 villages)(RCT-S), or both trials. Villages in one study often formed part of another study. *[a]* There was no overlap between the villages in TAPS and the villages in the RCT on inequality. *[b]* The RCT on savings included all but one of the TAPS villages (the one to assess attrition) and 36 of the 40 villages from the RCT on inequality.

Appendix A has details about each dataset.

Table 11.2. Sample characteristics and descriptive statistics of shocks experienced in past year, by survey year and study, and total

Table 11.2A. Sample size of people /a/

						Year					
	2004	2005	2006	2007	2008	2008	2009	2010	2011	2012	Total
Study:	TAPS	TAPS	TAPS	TAPS	TAPS	RCT-I	TAPS	TAPS	RCT-S	RCT-S	
TAPS	574	678	679	608	632	0	597	659	0	0	4,427
RCT-I	0	0	0	0	0	1,366	0	0	0	0	1,366
RCT-S	0	0	0	0	0	0	0	0	987	852	1,839
Total	574	678	679	608	632	1,366	597	659	987	852	7,632

Table 11.2B. Percentage of subjects who experienced any shock in past year /b/

	2004	2005	2006	2007	2008	2008	2009	2010	2011	2012	Total
No	54	64	67	67	82	73	82	85	48	52	67
Yes	46	36	33	33	18	27	18	15	52	48	33

Table 11.2C. Mean, SD, and median number of shocks experience by adult with at least one shock /c/

	2004	2005	2006	2007	2008	2008	2009	2010	2011	2012	Total
Mean	1.20	1.07	1.01	1.01	1.00	1.04	1.07	1.00	1.74	1.18	1.25
SD	0.47	0.26	0.09	0.10	0.00	0.19	0.26	0.00	1.01	0.40	0.63
Median	1	1	1	1	1	1	1	1	1	1	1

Table 11.2D. Percentage breakdown of shocks experienced by adults in past year /d/

	2004	2005	2006	2007	2008	2008	2009	2010	2011	2012	Total
Theft	18	11	1	8	4	8	2	4	4	2	6
Fire	1	1	1	1	0	2	0	6	5	2	2
Crop loss	19	6	9	14	2	9	18	1	7	5	9
Illness	29	50	19	48	68	68	56	44	56	76	54
Death	12	18	9	8	12	6	12	12	4	4	8
Floods	2	0	42	3	1	0	0	0	8	4	6
Animal	6	1	0	0	0	0	0	0	8	0	3
Other	2	1	2	0	4	2	0	1	1	1	1
Lost goods	3	1	2	1	1	1	0	1	0	0	1
Broken	0	0	0	0	0	0	0	0	0	0	0
Colonists	4	3	9	4	3	1	1	5	1	1	3
Gossip	1	4	4	15	3	3	10	26	1	1	4
House fell	0	0	0	0	0		0	0	2	3	1
Divorce	2	4	2	1	3	1	1	1	1	2	1
Total (%)	100	100	100	100	100	100	100	100	100	100	100
N	293	256	226	200	114	374	109	101	690	452	2,815

Table 11.2. Sample characteristics and descriptive statistics of shocks experienced in past year, by survey year and study, and total – continued

Notes:

/a/ The randomized-controlled trial on savings (RCT-S, 2011-2012) included 13 villages of the Tsimane' Amazonian Panel Study (TAPS)(2002-2010). Unless I say otherwise, TAPS excludes 2011-2012. For some trend analysis I include the TAPS villages measured during the RCT on savings; I indicate when I do so. The RCT on savings included 36 of the 40 villages of the RCT on inequality (RCT-I) done three years earlier. Sample size doesn't adjust for repeated observations of the same person.

/b/ Sample size is in Table 11.2A.

/c/ Sample size is in Table 11.2A. SD = standard deviation. SD = 0 because in some years surveys indicated that all adults had experienced only one shock.

/d/ Sample size is larger than the percentage of adults with a shock ("yes" in Table 11.2B) times the total sample size of all adults in Table 11.2A because some adults reported more than one shock in a year (Table 11.2C). Animal = death of animals. Broken refers to equipment or tools that broke. Zeros most often imply values were less than one percent.

Under the column *Total*, values differ slightly from the values in figures owing to greater rounding error in the tables.

Table 11.3. Self-reported ways of coping with shocks reported by adults who experienced a shock in the past year: Percentages from yearly surveys (2005-2010), TAPS and RCT on inequality (RCT-I)

			Year		RCT-I			
Cope:	2005	2006	2007	2008	2008	2009	2010	Total
Nothing	29	54	44	11	15	36	48	32
Alone	20	8	24	44	29	43	15	25
Credit	6	2	2	2	1	2	4	2
Wage	10	4	1	1	1	1	3	3
Emigrated	1	0	0	0	0	1	0	0
Family	8	9	16	14	20	9	7	13
Non-family	2	0	0	0	0	0	0	0
Sale of:								
Forest products	5	1	0	1	1	0	1	1
Livestock	2	0	0	0	0	1	0	1
Farm crops	8	0	0	2	1	0	0	2
Missionaries	1	3	2	7	6	1	2	4
Hospital	0	3	4	11	12	2	7	6
TAPS	3	2	0	4	0	1	0	1
Government:								
Tsimane'	1	8	1	0	1	0	1	2
Region	0	0	1	3	2	0	0	1
Town	0	0	1	0	1	0	0	0
Other	4	5	7	2	11	4	12	7
Total (%)	100	100	100	100	100	100	100	100
N	223	224	200	114	374	109	100	1,344

Table 11.3. Self-reported ways of coping with shocks reported by adults who experienced a shock in the past year: Percentages from yearly surveys (2005-2010), TAPS and RCT on inequality (RCT-I) - continued

Notes:

Sample includes adults who reported having had a shock during the past year and the main way they coped with the shock. The units of observation for the sample are the ways people coped with a shock; although most villagers reported one shock (Table 11.2C), some reported more than one shock. Emigrated = person left the village during or shortly after the flood, but came back by the time the survey took place. Forest, farm, and livestock refers to forest goods, farm crops, and livestock sold. Missionaries = help received in the mission station near the town of San Borja (Horeb) or in a mission along the Maniqui river (Misión Fátima). Under Government, Region refers to *prefectura* or *corregimiento* (regional governments) and Town refers to town government or town hall (*alcaldía*). The category Other does not consistently specify what else villagers did; surveyors rarely wrote in the notes what villagers had done to handle the shock. In one rare instance where surveyors wrote what else the villager had done, they noted a villager had gotten aid from another research team.

Table 11.4. Uses of money by adults the past year to deal with adverse shocks, randomized-controlled trial on savings (RCT-S, 2011-2012)

[A] Did you have to use money for the shock?

	Men	Women	Total
No	67%	69%	68%
Yes	33%	31%	32%
N	982	1,067	2,049

[B] Did you have to borrow money to deal with the shock?

	Men	Women	Total
No	93%	95%	94%
Yes	7%	5%	6%
N	959	1,038	1,997

[C] Did someone pay for the emergency?

	Men	Women	Total
No	87%	81%	84%
Yes	13%	19%	16%
N	677	722	1,399

Table 11.5. Trend analyses of shocks experienced by adults the year before the survey: Probability of experiencing a shock, number of shocks, probability of coping with shock, and perceived costs of shock

Explanatory variables:	(1) Shock	(2) Log # of shocks	(3) Cope	(4) Log costs
Survey year	-0.056***	-0.049***	0.023**	-0.048
	(0.004)	(0.004)	(0.011)	(0.044)
Female	-0.055***	-0.048***	-0.017	NA
	(0.009)	(0.009)	(0.021)	
RCT-I	0.050**	0.033**	NA	0.145
	(0.020)	(0.015)		(0.161)
RCT-S	0.480***	0.466***	NA	NA
	(0.024)	(0.021)		
Constant	NA	98.927***	NA	102.114
		(7.245)		(88.297)
Observations	7,632	7,632	1,344	777
R-squared	NA	0.086	NA	0.004
Characteristics of regressions and sample:				
Level	Adult	Adult	Adult	Household
Years	2005-2012	2005-2012	2005-2010	2005-2010
Regression type	Probit	OLS	Probit	OLS
Studies	2 RCTs + TAPS	2 RCTs + TAPS	TAPS	TAPS + RCT-I
Excluded	TAPS	TAPS	NA	TAPS
Cluster	Household-year	Household-year	Household-year	Village-year

Table 11.5. Trend analyses of shocks experienced by adults the year before the survey: Probability of experiencing a shock, number of shocks, probability of coping with shocks, and perceived costs of shock - continued

Notes:

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. NA: Not applicable. OLS: ordinary least squares.

Outcome variables:
(1) Shock is a binary variable if an adult reported having experienced any adverse shock during the past year (1=yes; 0=no). Table 11.2D has the list of adverse shocks.
(2) Natural logarithm using inverse hyperbolic sine transformation for the number of adverse shocks experienced by an adult during the past year.
(3) Cope is a binary variable for whether the adult reported having done anything to cope with the shock (1=yes, something; 0=no, nothing). People who reported no shocks are excluded from the regression. See Table 11.3 for ways of coping with shocks.
(4) Costs is the self-reported estimate of the cash cost of the shock, summed for all the adults in the household who reported both a shock and a cost estimate. Costs = 0 when either the person could not remember, when respondents mentioned other people gossiping about them, or when the person mentioned divorce (separation) as the shock. We assumed a daily cost of 20 *bolivianos* cost for each day lost to illness. I used Bolivia's CPI index to transform nominal values into real values. I took the natural logarithm of real values for the regressions.

Sample size for columns (1)-(2) includes all adults, across all years and studies (Table 11.2A), column (3) includes only those who answered the question on whether they had coped with the shock, as explained above. The estimate for column (4) is restricted to households with people who had shocks and reported cost estimates of the shock.

Probit regressions report marginal effects when continuous variables change by one unit above the sample mean; for binary variables, such as Female (female=1; male=0) or for the study, estimates are for a discrete change from zero to one.

Excluded: the study serving as a reference category.

RCT-I and RCT-S: randomized-controlled trial of village income inequality (RCT-I) or savings (RCT-S)

Table 11.6. Pairwise correlation between feelings, 2002-2010 (n = 4340)

	AngerG	Fear	AngerF	Sad	Happy
Fear	0.234***				
AngerF	0.339***	0.124***			
Sad	0.269***	0.315***	0.115***		
Happy	0.073***	0.063***	0.021	0.049*	
Smile	0.023	-0.032	0.088***	-0.026	0.006

Notes:

The table shows pairwise correlations between feelings, with p values adjusted by Šidák corrections for multiple comparisons. *, **, and *** indicate significance levels for p<0.05, p<0.01, and p<0.001. Feelings are binary variables equal to if the person reported having had the feeling at least once in the past week, and zero otherwise. The variables AngerG and AngerF refer to having been mad at family (AngerF) or at non-family members (AngerG). Smile = 1 if, during the interview, the person laughed or laughed loudly and often; Smile = 0 if the person did not laugh or smiled, or only smiled but did not laugh.

Table 11.7. Summary statistics of variables for longitudinal analysis. Association between *(i)* having been bedridden and *(ii)* help received, alcohol consumption, and negative feelings among adults during the week before the interview. (Data combines TAPS [2002-2010] and baseline [2008] of the randomized-controlled trial on village income inequality).

						Years:					
Variables/a/:		2002	2003	2004	2005	2006	2007	2008	2009	2010	Total/c/
						Outcomes:					
Gifts	(%)				20.3	19.1	20.4	13.8	10.6	15.0	15.7
	N				622	623	485	1914	595	658	4897
Labor	(%)				5.3	3.2	6.6	5.5	1.5	2.1	4.3
	N				622	623	485	1916	595	658	4899
Credit	(%)	6.9	4.6	5.7	8.7	9.0	6.4	6.9	5.2	5.9	6.7
	N	568	541	505	622	623	485	1917	595	658	6514
Transfers	(%)				7.7	5.9	4.9	5.0	8.9	4.3	5.8
	N				622	596	485	1913	595	658	4869
Alcohol	(%)	21.6	21.9	23.5	27.0	24.2	21.9	24.3	18.0	22.1	23.1
	N	564	552	503	622	623	485	1892	595	656	6492
Negative	(%)	93.0	94.5	92.8	93.2	89.4	39.7	55.6	92.2	93.0	77.5
	N	489	544	502	622	623	486	1920	593	656	6435
						Predictors:					
Bed	(%)	18.9	21.8	18.4	32.0	38.2	26.3	17.7	24.7	18.2	22.8
	N	571	555	506	622	623	486	1922	592	658	6535
Women	(%)/b/	48.7	50.1	50.6	51.3	49.6	54.3	52.7	53.4	52.7	51.7
	N	571	555	506	622	623	486	1922	595	658	6538
Alone	(%)	87.8	83.0	83.5	27.5	33.1	34.2	31.9	31.4	34.5	45.1
	N	566	540	503	622	622	485	1913	595	658	6504
Borrow	(%)				12.5	4.8	11.5	14.2	12.8	13.4	12.2
	N				622	623	485	1919	595	658	4902

Notes:

/a/ All variables are binary and are set to one for the name of the variable, and zero otherwise. Outcomes: 1 if the person received *Gifts* of goods, *Labor* help, or *Credit* the past week, or unconditional cash gifts (*Transfers*) the past two months. *Alcohol* = 1 if the respondent consumed hard liquor or beer the past week and *Negative* equals 1 if the person reported having been sad, angry, or fearful the past week, or was smileless during the interview. Predictors: *Bed* = 1 if the person reported having been bedridden during the past week. *Women* = the subject's sex. When asked what they would do in an emergency, adults who said they would do nothing or had no support or had no access to credit had the variable *Alone* set to one. *Borrow* = 1 if the person said they had been able to borrow 100 *bolivianos* or more the past year for any reason, including emergencies.

/b/ The N under *Women* refers to the total sample, not just the sample of women.

/c/ Total = share (%) and total sample across all years.

Table 11.8. Association between *(i)* having been bedridden and *(ii)* help received or alcohol consumption and negative feelings among adults during the week before the interview: Regression results

	Outcomes:					
	(1)	(2)	(3)	(4)	(5)	(6)
Predictors:	Gifts	Labor	Credit	Transfers	Alcohol	Negative
Bed	0.056***	0.012	0.016*	0.019	0.012	0.054***
	(0.019)	(0.008)	(0.009)	(0.011)	(0.016)	(0.014)
Female	-0.029**	-0.037***	-0.074***	-0.010	-0.409***	0.069***
	(0.013)	(0.006)	(0.008)	(0.008)	(0.019)	(0.011)
Year	-0.015***	-0.005*	0.000	-0.002	0.001	-0.032***
	(0.003)	(0.003)	(0.002)	(0.005)	(0.003)	(0.003)
Constant	29.481***	9.876*	-0.057	4.624	-1.031	64.684***
	(6.516)	(5.079)	(4.454)	(9.349)	(6.088)	(6.894)
Years in sample	2005-2010	2005-2010	2002-2010	2005-2010	2002-2010	2002-2010
Observations	4,894	4,896	6,511	4,866	6,489	6,432
R-squared	0.010	0.010	0.022	0.002	0.235	0.044

Notes: Regressions are Ordinary Least Squares (OLS) and draw on the combined sample from TAPS (2002-2010) and the baseline (2008) of the trial of village income inequality. Robust standard errors clustered by village are in parentheses. Table 11.7 has the definition of the variables. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 11.9. Interaction effects between *(i)* having been bedridden and *(ii)* various forms of assistance received upon *Negative* feelings during the week before the interview among adults: Regression results.

Outcome: *Negative* feelings

Predictors:	(1) Gifts	(2) Labor	(3) Credit	(4) Transfers	(5) Alone	(6) Borrow
Bed*column heading	-0.017	0.023	0.003	-0.078	-0.045*	0.113**
	(0.033)	(0.059)	(0.039)	(0.057)	(0.026)	(0.050)
Bed	0.078***	0.078***	0.052***	0.087***	0.074***	0.065***
	(0.017)	(0.016)	(0.014)	(0.018)	(0.020)	(0.017)
Female	0.074***	0.066***	0.071***	0.071***	0.069***	0.071***
	(0.014)	(0.013)	(0.011)	(0.012)	(0.014)	(0.014)
Year	-0.001	-0.001	-0.032***	0.000	-0.026***	-0.005
	(0.005)	(0.005)	(0.003)	(0.005)	(0.005)	(0.005)
Years in sample	2005-2010	2005-2010	2002-2010	2005-2010	2002-2010	2002-2010
Observations	4,888	4,890	6,414	4,860	6,404	4,893
R-squared	0.015	0.014	0.044	0.015	0.046	0.015

Notes: Regressions are Ordinary Least Squares (OLS) and draw on the combined sample from TAPS (2002-2010) and the baseline (2008) of the trial of village income inequality. Each regression includes the following core predictors: *Bed*, *Female*, and *Year*. All these predictors are interacted with the variables indicated in the column heading, plus the variable in the column heading added by itself. To unclutter the table, the following predictors are left out of the table: *(i)* interaction of column heading with *Female* or *Year*, *(ii)* the variable in the column heading used as a predictor, and *(iii)* the constant. Robust standard errors clustered by village are in parentheses. Table 11.7 has the definition of the variables. *** p<0.01, ** p<0.05, * p<0.10.

Appendix A

Queries and instructions surveyors used to obtain information on shocks and outcomes

The appendix has the questions or instructions to garner answers from adults about the topics of this chapter. Except for the module on illness, the other modules referred to adults, generally Tsimane' 16 years of age or older, unless they headed a household. For each topic, I remark on problems with the method of data collection.

| **Yearly shocks: General** |
|---|
| *Instructions*: Ask each adult for any problem (death, illness, theft, crop loss, etc.) suffered in the past 12 months. If they don't report a problem, put a zero. Only record serious illnesses. Assign 20 *bolivianos* (Bs)/day for each bedridden day lost to illness; if the shock was gossip, like people bad-mouthing the subject, put 'not relevant' for cost of shock. |
| *Comments*:
[a] Shocks. Surveyors used predefined codes to classify shocks (and ways to cope with shocks), putting unusual answers into the category *Other*.
[b] Cope. If subjects reported a misadventure, they were asked how they had coped, with zero recorded if subjects had done nothing. Selling farm crops was coded inconsistently. The first year we collected data on coping (2005) we asked villagers about selling rice; after 2005 we asked about the sale of any farm crop.
[c] Costs. Surveyors put zero when respondent reported a cost but could not estimate the cost, or when respondent reported a divorce (separation) or mentioned people gossiping about them. |
| **Yearly shocks: Two ancillary modules (Emigration and Aid) about the 2016 flood** |
| *Emigration*. *Instructions*: Only for people who said they had emigrated due to the 2006 flood. The questions were as follows: Where did they go? How many weeks did they stay in the new village? Now that you think back about the flood, do you regret not having done something to protect yourself? What are you planning to do for next year's rainy season? |
| *Aid*. *Instructions*: If person suffered a loss from the flood, indicate the good received, the quantity, value, and from whom. Assign prices from the town of San Borja to these goods. |
| **Illness** |
| *Instructions*: First ask about all illnesses each person had the seven days before the interview, and then ask the same questions for the 8-14 days before the interview. For participants under 16 years of age, ask the mother and, if she is not present, first ask the person in charge of the child and, if that person is not present, ask the father. Ask specifically if subjects during the past two weeks had looked pale, or had any of the following symptoms: Sore throat, fever, cough, diarrhea, diarrhea with blood, open wounds. |
| *Comments*: During most years and studies, surveyors collected information on four morbidity topics: *i)* illness and illness symptoms for the seven days before the interview, *ii)* illness and illness symptoms for the 8-14 days before the interview, *iii)* bedridden days for the seven days before the interview, and *iv)* bedridden days for the 8-14 days before the interview. For Figure 11.8 I include everyone in the sample, but I restrict the analysis of Tables 11.7-11.8 to bedridden days of adults during the past seven days (*iii*) because the trial on village income inequality did not collect data on the three other topics and also because the analysis of the association between weekly health and weekly outcomes is only for adults. |

Illness (continued)
Comments: [a] Missing records. I dropped records with all missing data because I could not tell if they were attriters, people we missed, or villagers who did not want to speak with surveyors. [b] Rounding. I rounded up fractional values for bedridden days. I rounded eight values of 0.5 bedridden days to one and three values of 1.5 bedridden days to two. Since, for the analysis of bedridden days of Table 11.7, I changed further the variable for the number of bedridden days into a binary variable if a person was ever bedridden due to illness in the past week, my rounding does not affect the results of the analysis.
Gifts and labor help
Instructions: *Gifts*: Ask all adults about gifts given and received the past week from people who were not members of the household, such as rice, plantains, manioc, medicines, meat, or fish. Surveyors noted the item, the value, and the type of person who gave the gift. *Labor help*: Ask all adults about help given and help received the past week. Examples include help fishing, hunting, doing farm work, making a house, shopping, curing. If three people helped during two days, enter six person-days. The instructions asked surveyors to indicate the type of work, the number of days of help received, and the type of person who helped (e.g., kin, unrelated kin from village).
Comments-general: [a] We asked about labor help and gifts given and received, but in this chapter I restrict myself to what came in because I want to know the types of aid people got when sick. [b] The coding of the variable for who helped or who gave the gift had one ambiguity. Among the following three answers *Villager*, *Close family*, and *Unrelated villager* we did not provide guidelines to distinguish between a *Villager* and an *Unrelated villager*. I assume a *Villager* was a distant relative, too distant to be close family and too near to be unrelated. *Comments-gifts:* [c] Items: There were 97 unique items received as gifts, but 15 accounted for 87% of observations. I used Tsimane' names for wild animals received as gift. [d] Value: Surveyors assigned the value based on current village prices. See chapter. *Comments-labor*: [e] In 2005, when asking about help received, we asked about the number of people who helped in the past week and converted the answer into person-days (see example under instructions). In later years, we asked about person-days of help received, also in the past week. The small difference in wording still allows us to capture the same concept: person-days of work assistance received. [f] The instructions did not specify that help had to include non-paid help received or that we only wanted information on help from people beyond the household. I doubt the elisions caused damage because we asked separately about wage labor and expenditures and because in the gift module the instructions specified we were only interested in gifts from non-household members. [g] We don't know how many hours of help are implied in a person-day. The number is probably best seen as the number of times people helped the subject.

Credit
Instructions: Credit past week: How much money did you borrow in the past seven days? Indicate the type of lender, amount borrowed, and, starting in 2005, we asked about the reason for borrowing. *Credit for an emergency:* What would you do if you had an emergency and needed 100 *bolivianos*?
Comments-credit past week: [a] Of the 475 people who got a loan, only six took out more than one loan. *Comments-credit for an emergency.* [b] This question varied how it was asked and coded, and is used in two ways. During 2002-2004, we asked "Could you borrow if you had an emergency?" and coded answers as yes/no. During 2005-2010, we ask "What would you do if you had an emergency and needed 100 *bolivianos*?" and had 12 choices in 2005 and 20 in 2006-2010. Because the questions during 2005-2010 included an option for "nothing", I recoded answers from 2005-2010 to match answers from 2002-2004 into a variable called *Alone*, which equaled one if respondents could not borrow or would do nothing, and 0 if they could borrow or had other options. To assess more specifically how they would obtain 100 *bolivianos* (e.g., accost a relative, sell goods), I limit the analysis to 2006-2010 because we used the same codes during those years.
REMITTANCES [Transfers or gifts of cash]
Instructions: How much money did you received in the past seven days, past 8-14 days, and during the past 2 months (excluding the past 14 days). The instructions said to include only gifts of money and exclude repayment for loans given out by the subject, or for delayed payments received by the subject.   Besides asking about the amount, we asked about the type of person or institution supplying the money, and the reason.
Comments: [a] In the RCT of 2008 we asked for only the past seven days. In the 2005 survey we asked about cash received during the past 14 days without distinguishing between the past seven days and the past 8-14 days. [b] When answering the question of the motivation for the gift, there was confusion in answers as some people listed government transfers (e.g., social security payments [*Bono sol*], conditional cash transfers for schooling or health). Because we coded for the giver, we dropped public transfers to be left with private transfers. [c] Reasons for the transfers were coded as text and were grouped into the categories shown in Figure 11.21. For example, respondents mentioned the specific food they bought with the money; for the analysis, we recoded and lumped specific food into an overall category called *Food*. [d] There was some confusion among respondents when asked why they received the transfer. Some mentioned the reason, such as kindness, but most mentioned the end-uses of the cash donation.

Feelings
Instructions: Self-reported feelings: Surveyors asked how often subject had experienced the following feeling: [i] general anger at non-family members (AngerG), [ii] anger at family members (AngerF), [iii] happiness, [iv] sadness, and [i] fear. *Smiles:* Surveyors coded respondent's laughter and smiles during the interview using four codes (1 = didn't laugh or smiled [Glum], 2 = no laughter but smiled [Smile], 3 = laughed and smiled several times [Laugh], 4 = laughed loudly and often [Guffaw].
Comments: [a] Coding for self-reported answers varied between years. For example, during some years we coded feelings as 1=never, 2=sometimes, 3=always, but in other years (e.g., 2005-2006) we coded the number of times respondents had the feeling. To standardized coding, I recoded variables as 1/0, assigning a one to a person who had the feeling (independent of the frequency), and zero to one who didn't.   [b] No data on feelings gathered in 2007-2008 of the longitudinal study, and only sadness and anger at non-family members (AngerG) collected during the baseline of the randomized-controlled trial.   [c] Subjects with disabilities who could not answer questions were dropped in 2004 (n=5), 2008 (n=2), and 2009 (n=2).   [d] The baseline of the RCT (2008) had 67 missing values (4.9%) for smiles, probably because the variable for smile was included in the health module, which might have taken place in a different day than the other modules.
Drinking
Instructions: The main question was, In the past week how often have you consumed alcohol? Participants were then (or also) asked about the amount of hard alcohol and beer consumed.
Comments: [a] Coding errors. For instance, sometimes participants reported having consumed alcohol in the past week but had values of zero for the amount consumed.   [b] Coding inconsistencies. During 2010-2008 in the TAPS study we asked about bottles of beer consumed; in earlier years we asked about liters consumed. In 2004 we only asked about liters of alcohol consumed, not about beer or frequency of drinking and in 2002-2003 we asked about the number of times adults had consumed alcohol. During 2002-2004 we asked only about hard liquor; in other years we asked about hard liquor and beer.   [c] To address [a]-[b] I created a binary variable for any reported alcohol consumption; the variable took the value of one if the person said they had consumed alcohol, or reported the amount of alcohol or beer (irrespective of the units), and zero if the person reported not having consumed any alcohol the past seven days.

Appendix B

Ways adults coped with sickness in the past year (%)
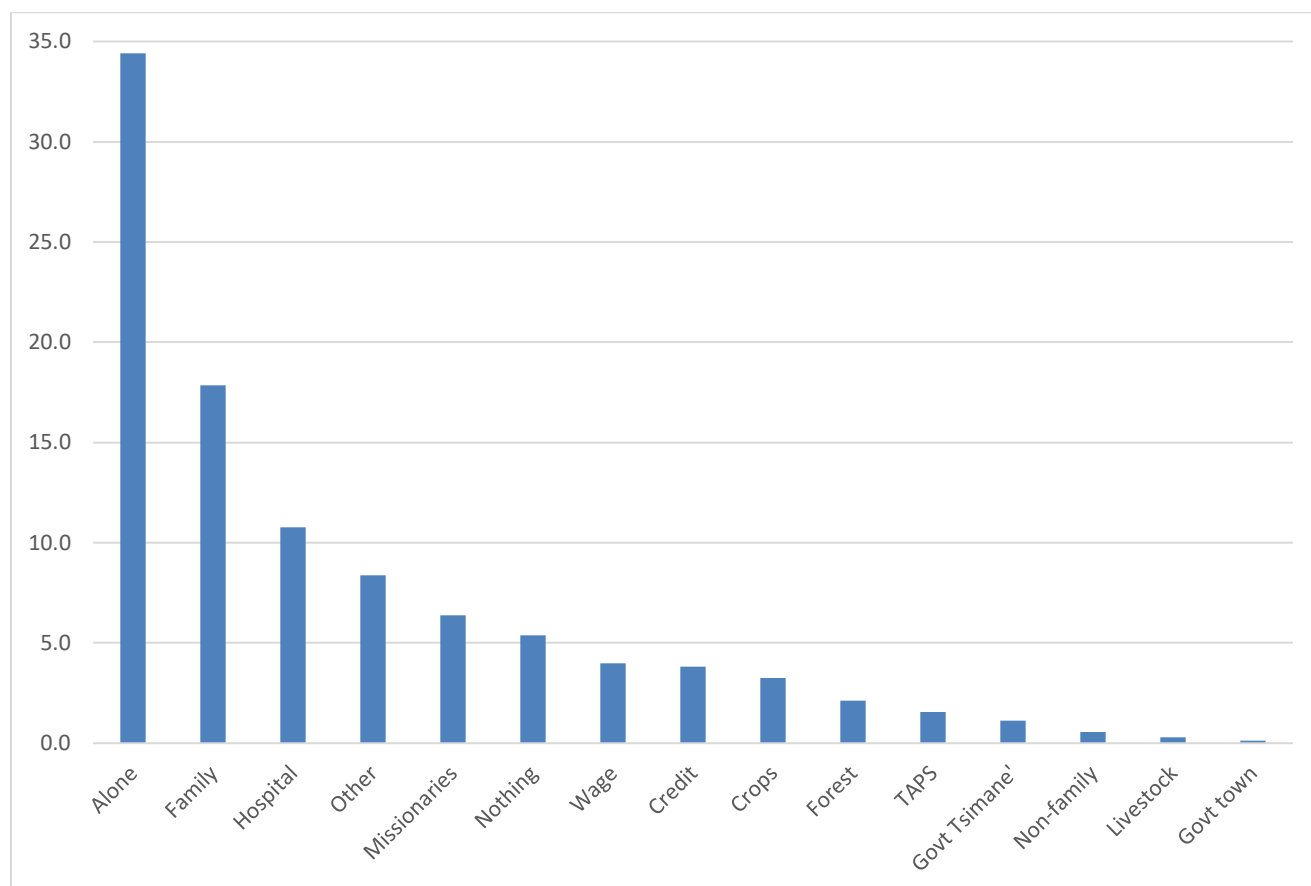
Sample and years: TAPS (2005-2010) and baseline trial of village income inequality (2008). N = 706. See Figure 11.4a for definition of column labels.

Appendix C

Use of cash to pay for health care:
Data from a five-quarter panel study (May 2002 - August 2003)

In this five-quarter panel study we asked how much cash was spent for each reported symptom or illness the past two weeks for each household member.   In the graph below I identify the main health-care providers when cash was used, and in the table below I show what predicted whether cash was spent (column 1) and the amount spent (column 2).

Of the 8078 records in the dataset, 5491 (68%) dealt with a symptom or sickness and for 28% of these cases (n = 1543) cash was used. The graph shows family members were the main caregivers when money was used, accounting for nearly half the cases. To say kin were the main health caregivers doesn't mean kin were paid to provide the service; it means instead that a family member used cash to cover fares or to buy drugs for the sick relative. Next came medical workers, which included hospitals, private medical doctors, nurses, and other paramedics. In 40% of cases when cash was spent, these workers provided care; Tsimane' used cash for fares, drugs, and, in contrast to the care provided by family members, to pay for services. The bin Healer has records for Tsimane' village healers (1.81%) and for a trusted *mestizo* healer living in the Maniqui basin whom Tsimane' visit for consults and treatments (6.09%). With either type of healer, in our data, cash was needed to buy items for the cure (e.g., alcohol), to pay for services, or for both. Besides these caregivers, Tsimane' used cash to pay for health services or to buy drugs from a miscellany of providers, like loggers, ranchers, teachers, and traders.

The table shows that the likelihood of using any cash and the amount spent varied by season, year, illness type, and provider. Column (1) shows the chances of using any cash increased by five percentage points during the start of the dry season (April-June), by 4.6 percentage points from 2002 to 2003, and by 5.4 percentage points if the symptom or illness was common, meaning grippe, stomachache, headache, diarrhea, or fever. When family members provided health care, the chances of using cash contracted by 45 percentage points. The amount of health expenditures also varied, but in different ways. At the beginning of the rainy season (October-December), cash expenditures for health were 50% lower than in the first quarter. Expenditures in 2003 fell by 41% compared with expenditures in 2002. Outlays were 44% lower when family members provided care, but 68% higher when traditional healers did. Compared with unusual ailments and symptoms, the five most common disorders required 56% less out-of-pocket expenditures.

In conclusion, in 28% of cases when illnesses or their symptoms flared up, Tsimane' needed cash to pay for care. This happened even when visiting traditional healers, whom villagers relied on to cure maladies, like sorcery, beyond the efficacy of Western medicine. One would have thought that for common disorders like stomachaches, Tsimane' would have treated themselves with forest products, but apparently not. In the remaining 72% of cases when no cash was spent to get well (n = 3948), Tsimane' did nothing (78%) about the malady, or spent time searching for a cure, probably around the village forests. Though important, dependence on cash to get well varied in time and space. Illness might drive Tsimane' to the market economy in search of cash to cover health care expenses, but it doesn't always.

Health-care providers when cash was used for treatment (%)
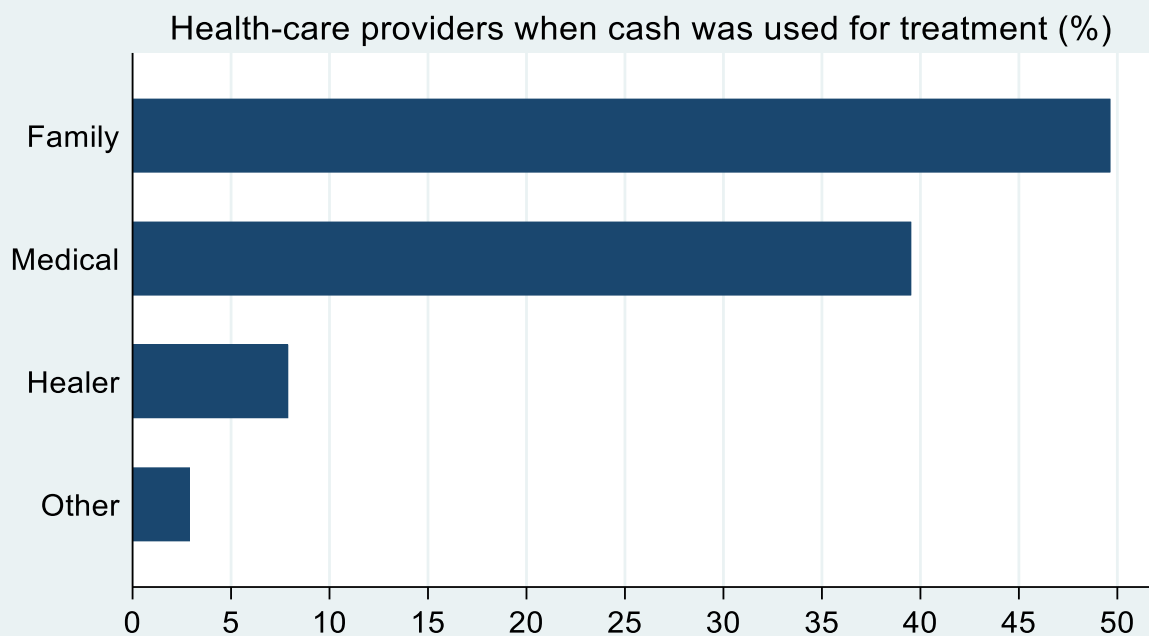
Data comes from a five-quarter panel (5/2002-8/2003). Unique number of people without repeats = 877. 1543 observations. Observations are symptoms or illnesses in past 14 days; one person could have more than one observation/quarter. Medical = doctors, hospitals, nurses, pharmacy, missionaries, non-government organizations, and other paramedics. Healer = Tsimane' traditional healer and mestizo healer. Other = loggers, ranchers, traders teachers.

Predictors of (1) using cash and (2) the amount of cash spent to treat symptoms or ailments: Regression results from a five-quarter panel study (May 2002-August 2003)
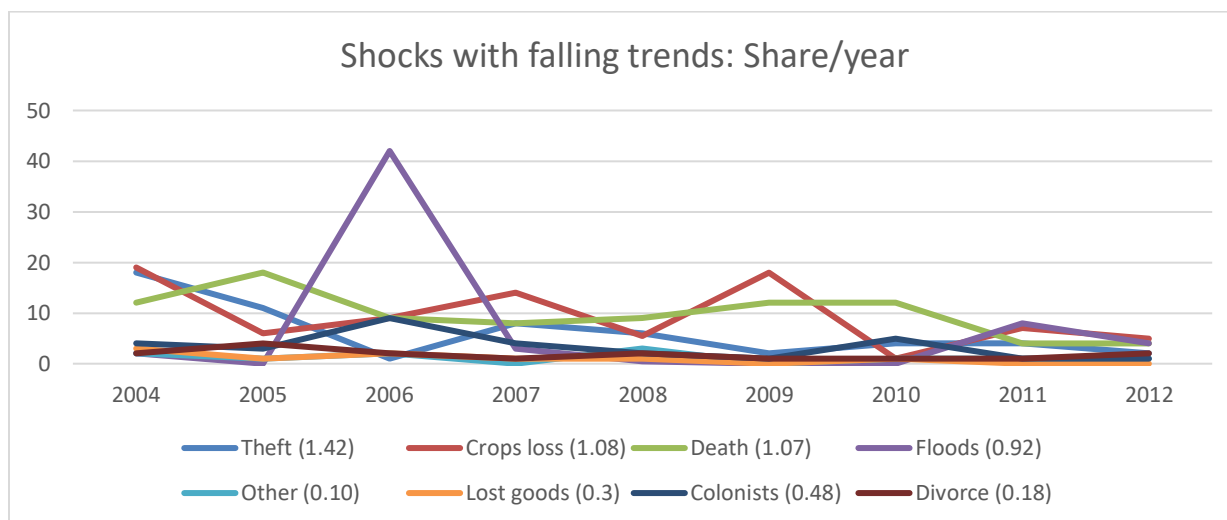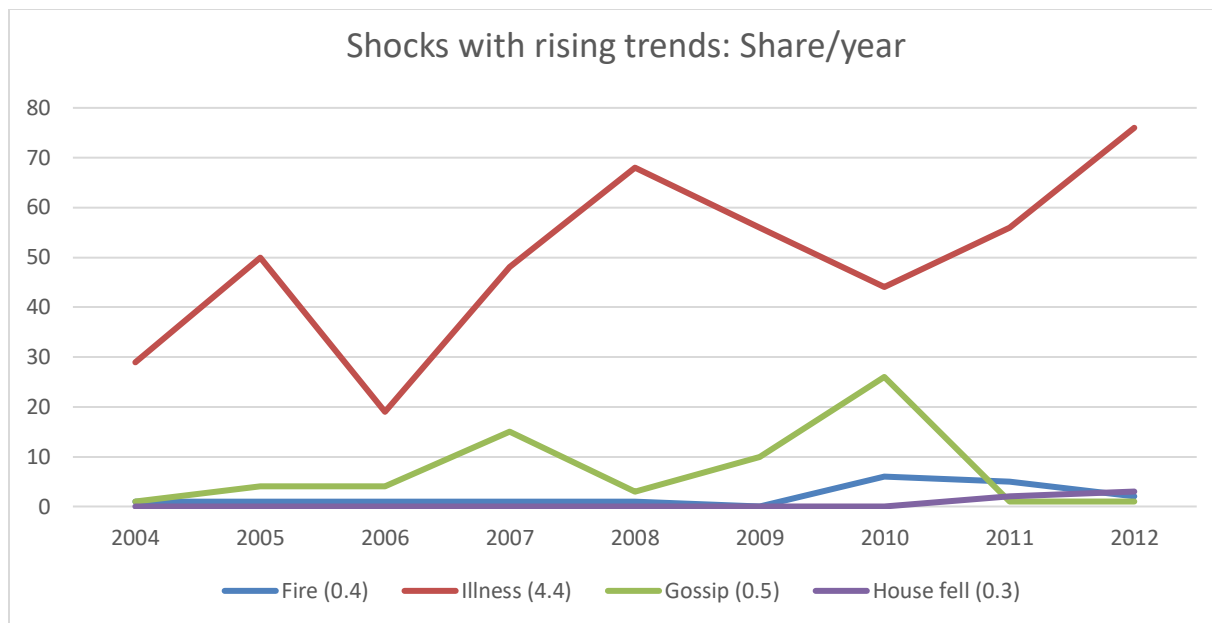
Predictors:	(1) Money	(2) Log cash
Quarters (reference = Jan-March):		
April-June	0.050**	0.007
	(0.025)	(0.113)
July-Sept	0.047	-0.055
	(0.029)	(0.122)
Oct-Dec	0.007	-0.502***
	(0.033)	(0.147)
Year (2002-2003)	0.046*	-0.416***
	(0.024)	(0.100)
Provider (reference = Medical):		
Healer	-0.005	0.685***
	(0.033)	(0.130)
Family	-0.451***	-0.442***
	(0.020)	(0.069)
Other	-0.828***	0.124
	(0.018)	(0.197)
Common	0.054***	-0.560***
	(0.016)	(0.071)
Constant	-91.794*	834.922***
	(47.453)	(200.008)
Observations	3,199	1,543
R-squared	0.330	0.145

Notes: Regressions are Ordinary Least Squares (OLS); robust standard errors clustered by subject are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Data collected quarterly; one person could have several records in a quarter if cash was used more than once to pay for health expenses. "Common" is a binary variable = 1 if the symptom or illness accounted for five percent or more of observations in the dataset, and zero otherwise. "Common" included five widespread symptoms or illnesses: grippe, diarrhea, stomachache, headache, and fever. The outcome variable for column (1) is a binary variable = 1 if cash was used to treat the ailment, and zero otherwise. The outcome for the second column is the natural logarithm of cash expenditures to treat the ailment or symptom; the value excludes zeros for records where no cash was used. For definition of Provider, see the notes to the figure in this appendix.

Appendix D

Yearly trends of shocks during the past year

The figures below show the yearly share of the sample experiencing different shocks. Numbers at the bottom of the graphs show yearly change in the share. Shocks have been split into those with rising and falling trends. I omitted one shock, Broken, because it had no visible change. For 2008 I took the average of the longitudinal study and the baseline of the randomized trial on inequality.

Shocks with rising trends: Share/year

Fire (0.4) Illness (4.4) Gossip (0.5) House fell (0.3)

Shocks with falling trends: Share/year

Theft (1.42) Crops loss (1.08) Death (1.07) Floods (0.92)
Other (0.10) Lost goods (0.3) Colonists (0.48) Divorce (0.18)

Appendix E

Guide to tables and figures for Chapter 11

To replicate the tables and figures of this chapter requires following a three-step approach.

- Step #1. The do file that <u>creates</u> the clean dataset for each outcome has to be run first. For instance, the do file *cr*Shocks_V1 creates two clean dataset to analyze the shocks experienced the past year.
    - o Clean dataset #1. The first dataset contains disaggregated information on the outcome, meaning that it accepts valid repeats as would happen if a person received several gifts the past week or a person reported several shocks the past year.
    - o Clean dataset #2. The second dataset contains summary statistics with one record/person/year.
- Step #2. The do file that <u>analyzes</u> clean dataset #1 has to be run second. For example, run the do file *an*Shocks_V1 to analyze the clean dataset on yearly shocks.

The first two steps produce the datasets, tables, and figures and examine each outcome separately, irrespective of whether the outcome refers to the past year or the past seven days. Steps 1-2 exploit data with valid repeats. To examine the associations between (a) being bedridden during the past week and (b) contemporaneous sociality or negative emotions implement the third step. Unlike step 2, step 3 uses summary statistics of one record per person per adult.

- Step #3. The do file cr_ALL_V1 implements all the do files of the first step and the do file an_ALL_V1 implements the analysis using clean dataset #2.

Output:		Do file that:		Created
Figure	Table	Creates data	Produces output	
11.1-11.7		crShocks_V1	anShocks_V1	
11.8		crIllness_V4	anIllness_V1	
11.9-11.11		crSK_gifts_V2	anSK_gifts_labor_V1	
11.12-11.14		crSK_labor_V1	anSK_gifts_labor_V1	
11.15-11.17		crSK_credit_V1	anSK_credit_V1	
11.18-11.19		crSK_credit_emergency_V1	anSK_credit_V1	
11.20-11.22		crSK_remittances_V1	anSK_remittances_V1	
11.23-11.24		crSK_feelings_V1	anSK_feelings_V1	
11.25		cr_drinking_V1	anDrinking_V1	
11.26-11.27		crShocks_V1	anShocks_V1	
	11.1			Manually
	11.2-11.5	crShocks_V1	anShocks_V1	
	11.6	crSK_feelings_V1	anSK_feelings_V1	
	11.7-11.9	cr_ALL_V1	an_ALL_V1	
Appendix B		crShocks_V1	anShocks_V1	
Appendix C	Appendix C	The do file an5Q_Illness creates & analyzes data		
Appendix D				From Table 11.2D

Reference List

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[i] See Appendix C for an exception. During the first two years of the study, we asked villagers to report what they had done about each bout with an illness.

[ii] The method to assess the visibility goods and behaviors can be found in Undurraga et al. (2016). In unpublished research, Heffetz collected data from 115 adult women and men in three Tsimane' villages and found that sickness ranked at the top of 27 behaviors of what he termed cultural visibility. Villagers were asked roughly the following question: "If someone else [women or men] was [behavior], in the village [far, near from your home], how long would it take you to notice it?". For example, "If a woman was cooking in another house near your home, how long would it take before you noticed it?" He reason that the shorter the time it took someone to notice the behavior of others beyond the household, the more culturally visible was the behavior.

[iii] Researchers used TAPS villages for two other randomized-controlled trials, both briefly described or alluded to in Chapter 4: one to grow a cover crop and one to map village lands. Both trials used the villages of the longitudinal study, but neither produced significant changes. Unpublished analysis of the cover-crop trial showed no significant change. Reyes-García *et al*. (2012) published the null findings of the mapping trial.

[iv] The outcomes measured included the value of financial assets (e.g., cash at home, bank savings), value and number of physical assets (*sensu* Chapter 9), monetary expenditures, consumption of temptation goods (e.g., alcohol, cigarettes), blood pressure, and sources of monetary income. Of these, the trial increased only cash at home and alcohol consumption.

[v] The data has a handful of cases where a person, in a year, reported the same illness twice and two ways of coping, such as going to a hospital and asking the TAPS team for help. In these

cases we cannot be sure if the same illness at one time was handled in two different ways, or if the person got sick twice and did something different each time.

[vi] Two studies had cost data: TAPS (2005-2010) and the trial on village inequality (2008). We started collecting shock data in TAPS in 2004, but did not start collecting yearly cost data until a year later.

[vii] In 2005, employers who offered meals as part of the wage paid a daily median nominal wage of 25 *bolivianos*; employers who provided meals paid 30 *bolivianos*. By 2010, the last year with cost data, median nominal wages had risen to 55 *bolivianos* (without meals) and 50 *bolivianos* (with meals).

[viii] The dataset on household aid shows households had one record for each distinct item received; e.g., they had one record for the amount of rice, another record for the number of mosquito nets. I found four ignorable exceptions. Four households had two records for an item; three households had different monetary value for the items, most likely because they got the same good but with a different price on different dates. The fourth households received the same item in installments, with the same monetary value. Few and logical, the four cases do not merit exiling them from the dataset.

[ix] TAPS: I found one record of a person with missing data on shocks in TAPS (2005-2010). We did not ask how villagers had dealt with shocks until 2005, and did not ask about it in the savings trial (2011-2012). Thirty-six observations had missing data on coping during 2005-2010; the 36 observations accounted for 0.93% of all observations. RCT on village income inequality: There was no missing data on shocks or coping with shocks.

[x] The estimates come running three household-year fixed-effect panel regressions. As outcomes I included binary variables for deaths in the household, crop losses, and floods, as reported by the wife or the husband. On the right side of the equation, I had a binary variable for the spouse (wife = 1; husband = 0). p-values for the spouse variable when using crop losses and floods were <0.001%; for deaths, the p-value was 0.88. Results can be found in do file anShocks_V1.

[xi] In the savings trial, the chi-square test for the female-male difference in the chances of reporting a shock yielded statistically insignificant results ($p = 0.652$), but in the TAPS dataset and in the inequality trial, female-male differences were significant, with p-values in both studies < 0.001. The do file anShocks_V1 has the result of these tests.

[xii] The regular module on shocks turned up one emigrant. The number in the two modules should have been the same, but were not; both numbers were small.

[xiii] In analysis not shown, I found women and men did not differ in trends, except for the probability of actively coping with the shock (Table 11.5, column 3). The probability a woman would have done anything to cope with a shock increased by 1.9% a year ($p = 0.17$; $n = 598$); among men, the probability increased by 2.5% a year ($p = 0.04$; $n = 746$).

xiv The yearly percentages were high and increased. Between 2011 and 2012, the share of sick villagers who used cash rose from 70% to 85%; the share of villagers who reported using cash after a family death went up from 63% to 68%.

xv Results come from regressing the total number of ailments and symptoms of a person in a year against survey year and a gender variable. I used an inverse hyperbolic sine transformation to take logarithms of the outcome, an ordinary least square regression, and robust standard errors clustered by subjects-year-study. Results were significant at <0.001 (n = 15,847) and can be found in Stata do file anIllness_V1. I tested and found no significant interaction effects between gender and year.

xvi In one case, a villager listed more than one lender they would accost if faced with an emergency. For this person, I kept the first lender they mentioned.

xvii Figure 11.19 depicts accurately responses from each of the two studies. Although I do not show them separately, answers from the longitudinal study and the randomized-controlled trial were similar.

xviii We should have, yet never, studied *compadrazgo*, the special bond between godparents and, in most cases, the child's parents. I think the practice is rare among Tsimane'. I did not hear of Tsimane' naming each other as *compadres*. Tsimane' living near towns will sometimes ask foreign researchers or town dwellers to be their child's godparent. Once established, the relation opens a two-way flow of gifts and grift. When they visit town, Tsimane' might ask for lodging and bring gifts of crops for their *compadres,* who reciprocate, then or later, with gifts of school supplies, clothing, or medicines for the godchild, or with cash to buy these goods. Town dwellers, too, expect lodging when they stay in the village of their *compadres*. *Compadrazgo* can morph into a tentacle to use and abuse the partner, like a town merchant who stays in his *compadre*'s home as the merchant higgles with villagers to cut logs from the village commons, or like the villagers who over and over find an excuse to ask their *compadres* for one more favor. Some of the cash gifts villagers reported receiving might have come from *compadres*.

xix The median nominal value for a gift received the past seven days, for the past 8-14 days, and for the past 3-8 weeks were the same, 50 *bolivianos*. The average nominal value of gifts for the past seven days was 54 *bolivianos* (SD = 51), lower than the mean value of gifts received the past 8-14 days (115 *bolivianos*; SD = 150) or the past 3-8 weeks (84 *bolivianos*; SD = 97). Differences in mean values were not statistically significant at the 95% confidence level or higher. Results can be found in the do file anSK_remittances_V1.

xx We asked about other feelings (e.g., jealousy) or events that, among Tsimane', affect mirth, like the frequency of visitors dropping by one's home.   I left out these feelings because they didn't bear directly on the chapter.

xxi In 2008, when Bolivia's President Evo Morales expelled the USA ambassador from Bolivia, missionaries withdrew from their headquarters in the outskirts of the town of San Borja and resettled in the Department of Cochabamba. Ever since their permanent departure, missionaries have returned quarterly to their old headquarters to check on the status of the radio station,

staffed by Tsimane' hired by missionaries. The station transmits sermons, church music, and messages, all in Tsimane'.

[xxii] I do not show graphs or tables comparing the share of women and men who consumed alcohol, or the share of drinkers in the three studies. The Stata do file that created Figure 11.25 produced the statistics comparing women and men. See do file anDrinking_V1.

[xxiii] I redid Table 11.8 using the number of days in bed instead of the binary variable *Bed*, and found essentially the same results. An increase in one day in the number of bedridden days the past week was associated with a 1.2 percentage-point increase in the chances of getting a gift (p = 0.007), a one percentage-point increase in the chances of receiving an unconditional gift of cash (p = 0.004), or having negative emotions (p = 0.01).

[xxiv] One could address the question with information from the longitudinal study (2002-2010) for public use. The dataset contains a unique subject identification number that links the same person across years, allowing one to examine the impact of shocks over time. I do not use that dataset because I wanted to enlarge the sample size and bring in new datasets from the randomized trials. I achieved the goal of enlarging the sample size but forewent the ability to identify the same person through time.

[xxv] To estimate trends in the probability of being bedridden, I used an ordinary least squares regression (OLS) with robust standard errors clustered by village. The results showed the chances of being bedridden fell by 0.4 percentage points each year (p = 0.17). A lower-censored Tobit regression showed that the number of days confined to bed fell yearly by 3.1% (p = 0.04) in the entire sample. Restricted to the sample of adults confined to bed, an OLS regression showed the number of bedridden days rose yearly by 0.8% (p=0.23). I also used a Tobit regression to estimate the trend in the number of ailments and symptoms reported. Each year saw a 2% decline in the health problems listed by adults (p = 0.001). All regressions controlled for gender. Results can be found in the do file an_ALL_V1.

[xxvi] I restrict the analysis to 2005-2010 of the longitudinal study and to the baseline of the randomized-control trial of village inequality (2008) because those two studies, for those years, had information on shocks and coping (n = 916), with a mere 2.61% missing values for coping and none for shocks.

[xxvii] Trends come from a Probit regression with a binary outcome variable for each of the five ways of coping; for example, *Market* = 1 if person relied on the market (as defined in Figure 11.27), and *Market* = 0 when the person relied on other choices. Regressions include robust standard errors and clustering by household-year. As predictors, I included a year and a gender variable. The sample was limited to the 916 records of people who had a shock and did something about it. The coefficient for the variable year are calculated as the probability of relying on one of the five ways, and were as follows: *Alone* = +4.5% (p = 0.001), *Social* = +0.6% (p = 0.49), *Institutions* = +1.4% (p = 0.18), *Market* = -6.2% (p = 0.001), *Other* = 1.2% (p = 0.17). Results are in do file anShocks_V1.

xxviii To assess if trends in the propensity to have negative feelings differed between bedridden and healthy adults I split the sample and re-estimated the regression in column 6 (Table 11.8), separately for bedridden and for hale adults. The chances of having negative emotions declined yearly by 3.1 percentage points for each group, but t values and sample sizes differed. The sample for bedridden adults was 1,472 and the t statistic for the year variable was 7.32. The sample for healthy villagers was 4,960 and the t statistic was 8.38. Results are in do file an_ALL_V1.

xxix Of the 1399 people surveyed about their monetary expenditure during 2006 and 2011, 12% regretted the expenditure. The analysis of coarse data from the savings trial (2011-2012) on expenditure in durable goods during the past year shows that in 2011, for 9% of expenditures respondents regretted the purchase (total n = 5822); the next year, the share had dropped to 7% (total n = 3992). See Godoy et al. (2010) on regret and Reyes-García et al. (2007) on impulsivity.