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# Subjective welfare, isolation, and relative consumption ☆

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**Abstract**

The recent literature has shown that subjective welfare depends on relative income. Much of the existing evidence comes from developed economies. What remains unclear is whether this is a universal human trait or an artifact of a prosperous, market-oriented lifestyle. Using data from Nepal, a mountainous country where many households still live in relative isolation, we test whether poorer and more isolated households care less about relative consumption. We find that they do not. We investigate possible reasons for this. We reject that it is due to parental concerns regarding the marriage prospects of their children. But we find evidence in support of the reference point hypothesis put forth by psychologists: household heads having migrated out of their birth district still judge the adequacy of their consumption in comparison with households in their district of origin.


*JEL classification:* I31; O12
*Keywords:* Subjective well-being; Relative deprivation; Rivalry

## 1. Introduction

The starting point of our investigation is the observation that people derive satisfaction not just from their own standard of living but also from faring better than their peers. This evidence comes from experimental and empirical data gathered by economists and psychologists, mostly in developed countries (e.g. Diener et al., 1999; Frey and Stutzer, 2002; Easterlin, 1974, 1995, 2001; Blanchflower et al., 2004; Luttmer, 2005).[1] Various interpretations have been proposed for these findings, such as envy, aversion to inequality, relative deprivation, or a human propensity to judge one's achievement relative to that of others (e.g. Runciman, 1966, Frey and Stutzer, 2002, Layard, 2002, Diener et al., 1999). What remains unclear is whether this is a universal human trait or an artifact of a prosperous, market-oriented lifestyle.

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[1] Perhaps the best illustration of this is the following experiment described in Layard (2002). Harvard students are asked whether they prefer earning $100,000 upon graduation when everyone else earns $200,000, or earning $50,000 when everyone else earns $25,000. In their overwhelming majority, participants to the experiment prefer the second option.

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This paper fills a gap in the now voluminous literature on relative consumption and subjective well-being by addressing two questions that have received little attention to date, namely: (1) Do the poor care less about relative consumption than the non-poor; and (2) Do people care less about relative consumption when they are isolated from markets. We could only find one recent empirical paper (Ravallon and Lokshin, 2005) that directly addresses the first question and none addressing the second.[2] Using micro data from a country where people have remained relatively isolated from outside influences, we answer the first question with a yes and the second with a no — if anything, households in isolated areas care more about what their neighbors consume.

These findings are important for two reasons. Suppose the poor were too concerned with everyday survival to judge their well-being in relation to that of others. This could be taken as a justification for focusing policy on the eradication of absolute poverty — as advocated for instance in the Millenium Development Goals. But if the poor also care about their relative position, raising their subjective welfare may require reducing inequality in society as a whole.[3] It also calls for rethinking development interventions at the local level. Development practitioners know that even the best designed policy interventions often fail because of conflict between rival interest groups. Cost-benefit analysis based on absolute welfare may be satisfying from an ethical and philosophical point of view. But it ignores that interpersonal rivalries affect perceived payoffs and can undermine the willingness to comply with newly created rules and institutions.

Secondly, it has been argued by some that invidious comparisons are exacerbated by an urban and hedonistic way of life.[4] For instance, in his influential analysis of rural societies in South-East Asia, Scott (1976) argues that markets foster competition between individuals, thereby undermining redistributive institutions and values.[5] If Scott's view is true, households with little market interaction should care less about relative incomes. This point of view has often been challenged by non-economists,[6] but it has nevertheless permeated the lay discourse on development — so much so that conflicts of interest that emerge with economic growth are often interpreted as symptoms of a loss of 'values' driven by a pernicious evolution of individual preferences, rather than the new expression of pre-existing rivalries. Economists have typically dismissed these ideas, without disproving them. We provide empirical evidence.

This paper differs from the existing literature in several respects. Using data from a detailed household survey, we focus on a country – Nepal – in which many communities have remained isolated from each other and from the rest of the world by the highest mountain range on earth.[7] If invidious preferences are found in Nepal, it is very unlikely that they are the result of contact with the 'modern world'.

The studied population is also less urban and less mobile than that found in countries previously studied, such as the US or South Africa. This suits our purpose. Psychologists have indeed shown that, when making relative consumption assessments, people compare themselves with a peer group composed of people who started from the same conditions. In Nepal, most people live along people they grew up with. Immediate neighbors thus constitute a natural reference group. This is an improvement over other studies that have often[8] relied on large entities, such as countries or US states, to test invidious preferences. Because these entities are too large to constitute a reasonable reference group, measurement error leads to attenuation bias. Our results suffer less from this problem.

Unlike other studies that have focused on answers to a general happiness question to gauge subjective well-being, we use subjective consumption adequacy questions. Answers to these questions are probably closer to utility derived from consumption because they ignore other factors susceptible of influencing well-being — such as disability, fear of crime, sexual satisfaction, etc.

[2] See however Kingdon and Knight (2004) who address the related question of race in South Africa.

[3] The relationship between consumption concerns and the design of redistributive policy raises a range of philosophical and ethical questions that go well beyond the scope of this paper. Layard (2002), for instance, argues that evidence that people care about relative consumption is justification for redistributive income taxation. But it is also possible to argue that envy is morally reprehensible and should not be condoned – or encouraged – by policy. The reader is referred to the political economy and social choice literatures for an in depth discussion of these complex issues.

[4] Perhaps the earliest presentation of this argument was made by Rousseau, who proposed the 'good savage' parable in response to Hobbes' depiction of the state of nature as anarchic and violent. Similar echoes can be found in the work of Thoreau. In fairness to non-economists, it should be emphasized that there is a voluminous literature, for instance in anthropology, that discusses status and hierarchies in pre-market societies.

[5] Scott's view has not gone unchallenged — see for instance (Popkin, 1979).

[6] See for instance the anthropological literature on status hierarchies in hunter-gatherer groups.

[7] To our knowledge, the .rst road into Katmandu, the capital city, was completed in 1929. At the time our survey data were collected (1995/6), many parts of the country were still inaccessible by road.

[8] Though not always: Luttmer, for instance, uses county-level US data and Kingdon and Knight use neighborhood data in South Africa.

They also allow comparisons across categories of consumption goods.[9]

Our main findings can be summarized as follows. We begin by showing that subjective consumption adequacy rises with relative consumption. The effect is robust, consistent across commodity groups, and strong in magnitude — so strong that in many cases we cannot reject the hypothesis that surveyed respondents only care about relative consumption. The effect is also larger in magnitude than that reported in a number of studies on developed countries.

We then test whether the poor care less about relative consumption than the non-poor. Results show that relative consumption affects subjective welfare even at low absolute or relative levels of consumption. This contradicts the findings reported by Ravallion and Lokshin (2005). Using data from Malawi, the authors find that subjective welfare falls with average neighborhood income, but only among upper income households. From this the authors conclude that the poor care solely about absolute deprivation. Nepal offers a suitable comparison point to Malawi, having only a slightly higher GDP per capita.[10] Why our results are different is unclear, but it may be because Ravallion and Lokshin do not adequately control for factors that raise utility and are positively correlated with average community income, such as public goods and redistributive transfers.[11] This is indeed the interpretation offered by Kingdon and Knight (2004) who show that, in South Africa, subjective well-being falls with average income in the district but rises with average income in the immediate neighborhood. They interpret the latter effect as indicative of local public goods and risk sharing among neighbors.

Next we test whether preferences are less invidious among geographically and socially isolated households, as would be the case if contact with the market makes people more competitive. Our results show the opposite: people living in isolated communities are *more* sensitive – not less – to the standard of living of their neighbors. We interpret this finding as consistent with attenuation bias: in isolated communities, neighbors more accurately approximate the relevant reference group than in more mobile urban communities. We also find that households with a migrant member working elsewhere are less sensitive to average consumption in their village.

Finally we investigate, to the extent allowed by the data, possible reasons for invidious preferences. One proposed explanation is that parents care about their relative standing in the community not for themselves but because it affects the success of their children in the marriage market.[12] We test this hypothesis — and reject it. Another explanation that has been proposed, mostly by psychologists, is that people judge their success in terms of relative achievement: satisfaction with life comes from having done at least as well as one's peers (e.g. Layard, 2002; Diener et al., 1995; Kahneman et al., 1999). To investigate this hypothesis, we test whether household heads who have migrated out of their birth district judge the adequacy of their consumption partly in relation with that of households in their district of origin. We find that they do. From this we conclude that the dependence of subjective satisfaction on relative consumption is a universal phenomena that applies also to populations that are poor and relatively isolated from market forces.

## 2. Testing strategy

Building on the framework developed by Runciman (1966) and revised by Blanchflower et al. (2004), Luttmer (2005) and others, our testing strategy is organized around three steps. First, we establish that subjective satisfaction depends on relative consumption. This step is similar to the above cited studies. Second, we test whether the poor care less about relative consumption than the non-poor. Third, we test whether isolated households care less about relative consumption than households located close to markets. We first explain the simple logic of these three tests. We then explain how we integrate subjective satisfaction with income and with specific commodity aggregates into a coherent model.

### 2.1. Testing relative consumption

We wish to test whether people care not only about their absolute level of consumption but also about their consumption relative to that of others. To capture this idea, let $x_{ik}=\log X_{ik}$ and $x_k=\log \bar{X}_k$ where $X_{ik}$ is $i$'s

[9] This latter point is central to the study of conspicuous consumption — see below.

[10] According to the Penn World Tables Mark 6.2 (Alan Heston, Robert Summers and Bettina Aten, Penn World Table Version 6.1, Center for International Comparisons at the University of Pennsylvania (CICUP), October 2002), Nepal had at the time of our survey a GDP of US$1222 per capita, compared to US$807 in Malawi in 2000. (PPP corrected figures are almost identical.) Both countries are among the poorest in the world today, ranking respectively 167th and 176th out of 180 ranked countries (International Monetary Fund, World Economic Outlook Database, April 2006). South Africa has a higher GDP per head - roughly ten times that of Malawi. But the standards of living of many South African blacks are similar to those in Malawi and Nepal.

[11] De Weerdt and Fafchamps (2007) document redistributive transfers among neighbors in Tanzania, a country bordering Malawi.

[12] We thank an anonymous referee for this suggestion.

consumption level of individual $i$ living in location $k$ and $\overline{X}_k$ is the average consumption level in location $k$. We postulate a utility function $V_{ik}$ of the form:

$$V_{ik} = \alpha x_{ik} - \beta x_k + \gamma z_{ik} \tag{2.1}$$

where $z_{ik}$ denotes a vector of taste shifters used as controls. Our testing strategy is to estimate (1) using answers to subjective consumption adequacy questions as proxy for utility, and to test whether $\beta$ is significantly different from 0.[13]

This is similar to the approach adopted by Blanchflower et al. (2004), using income rather than consumption. They use a slightly different regression equation of the form:

$$V_{ik} = \kappa \log X_{ik} + \theta \log (X_{ik}/\overline{X}_k) + \gamma z_{ik} \tag{2.2}$$

$$= \kappa x_{ik} + \theta(x_{ik} - x_k) + \gamma z_{ik} \tag{2.3}$$

where $\kappa$ is interpreted as an absolute income effect and $\theta$ as a relative income effect. Calculating $\overline{X}_k$ at the level of US states, they find that the coefficient of relative income $\theta$ is approximately equal to 40% of the coefficient of absolute income $\kappa$. Formulation (2) is formally equivalent to (1) with $\beta=\theta$ and $\alpha=\kappa+\theta$. We also test whether individuals care *only* about relative consumption, i.e., we test whether $\alpha=\beta$ in regression (1). This is equivalent to testing whether $\kappa=0$ in Eq. (2.2).

### 2.2. Relative consumption and poverty

We wish to investigate whether the non-poor are more sensitive to relative consumption. We do this in two ways. First we follow Ravallion and Lokshin (2005) and test whether the *absolute* poor care less about relative consumption, i.e., whether $\partial^2 V_{ik}/\partial x_k \partial x_{ik} < 0$. To this effect, we estimate a model of the form:

$$V_{ik} = \alpha x_{ik} - \beta_0 x_k + \beta_1 x_{ik} x_k + \gamma z_{ik} \tag{2.4}$$

If the non-poor are more rival, then $\beta_1 < 0$.

We also investigate whether the intensity of relative income preferences vary with *relative* poverty. This means testing whether $\theta$ is the same when $x_{ik}$ is above or below $x_k$. To test this idea, we estimate a model of the form:

$$V_{ik} = \kappa x_{ik} + \theta_l I(x_{ik}<x_k)(x_{ik} - x_k) + \theta_u I(x_{ik}\geq x_k)(x_{ik} - x_k) + \gamma z_{ik} \tag{2.5}$$

where $I(.)$ is an indicator function. We also use a non-parametric approach:

$$V_{ik} = \kappa x_{ik} + \phi(x_{ik} - x_k) + \gamma z_{ik} \tag{2.6}$$

and check the form of the unknown smooth function $\phi(.)$.

### 2.3. Relative consumption and markets

Next we test whether isolated people care less about their relative standing. Our testing strategy is as follows. Let $d_k$ represent proximity to markets. We estimate a regression model of the form:

$$V_{ik} = \alpha x_{ik} - \beta x_k + \gamma z_{ik} \tag{2.7}$$

$$\beta = \beta_0 - \beta_1 d_k \tag{2.8}$$

If $\beta_1 < 0$ this means that sensitivity towards relative consumption increases with market proximity. In the empirical analysis, we use two proxy variables for $d_k$: the average ward distance between households and the nearest market; and whether the household has a migrant member working elsewhere.

### 2.4. Multiple satisfaction indices

So far we have discussed utility as single index. In fact we have subjective satisfaction indicators for several consumption subsets $c_h$ such as food or clothing. To integrate these indicators into a coherent framework, we assume that total consumption can be decomposed into $H$ subsets. For simplicity, assume that utility is (approximately) Cobb–Douglas with respect to these $H$ subsets. Dropping $ik$ subscripts for easier reading, we have:

$$U = \sum_{h=1}^{H} \omega_h U^h$$

where $U^h$ is the sub-utility obtained from the consumption of good $h$ and the $\omega_h$ are consumption shares with $\sum \omega_h = 1$. Let:

$$U^h = \log c_h - \lambda_h \log \overline{c}_h \tag{2.9}$$

[13] The reader may wonder whether our testing strategy depends on whether people can move or not. Because we estimate utility directly, it does not, although the interpretation of the results varies somewhat. In the utility function (2.1), $x_k$ operates in the same way as a negative externality: controlling for own consumption $x_{ik}$, utility falls with the level of average consumption of others in $k$. If individuals are immobile, rivalry simply reduces the subjective satisfaction they derive from their consumption level. As shown empirically by Stark and Taylor (1991), if individuals are mobile, a high value of $x_k$ incites people to move away from $k$ unless they are compensated by a higher local income.

where $\overline{c}_h$ is average consumption of $h$ in the ward and $\lambda_h$ is a relative consumption coefficient that may vary across goods. If $\lambda_h=1$, utility depends only on relative consumption. Since $c_h$ is regarded as exogenous by individual consumers, utility maximization yields the usual $c_h = \frac{\omega_h X}{p_h}$.[14] Averaging over households in the ward to replace $\overline{c}_h$ we get:

$$U^h = (1-\lambda_h)\log\omega_h + \log X - \lambda_h \log \overline{X} - (1-\lambda_h)\log p_h \quad (2.10)$$

If $\lambda_h=1$, the price term vanishes since it affects individual and aggregate income symmetrically.

In practice we do not observe $U^h$ but a monotonic increasing function $V^h=g(U^h)$ of the form:

$$V^h = \alpha_h \log X - \beta_h \log \overline{X} + \gamma z$$

where $z$ is a vector of controls including prices, etc. The relative consumption coefficient $\lambda_h$ can thus be approximated as:

$$\lambda_h \approx \frac{\beta_h}{\alpha_h} \quad (2.11)$$

Comparing $\lambda_h$ for the different goods enables us to ascertain to what extent sensitivity to relative consumption varies across goods.

Since $\sum_{h=1}^{H} \omega_h=1$, indirect utility can be written:

$$U = \sum_{h=1}^{H} \omega_h\left(a_h + \log X - \lambda_h \log \overline{X}\right) = a + \log X - \lambda \log \overline{X} \quad (2.12)$$

where $a_h \equiv (1-\lambda_h)(\log \omega_h - \log p_h)$ and

$$\lambda = \sum_{h=1}^{H} \omega_h \lambda_h \quad (2.13)$$

The value of $\lambda$ for total utility is a weighted sum of partial rivalry coefficients, weighted by consumption shares. We use Eqs. (2.12) and (2.13) to indirectly verify whether the Cobb–Douglas framework is a reasonable approximation for our data.

## 3. The data

The data we use come from the Nepalese Living Standard Measurement Survey (LSMS) of 1995/96. We prefer to use this survey than a more recent one because the country was poorer and its road and market infrastructure were less developed then than they are now. These features facilitate inference regarding the effect of isolation and the existence of rival preferences at very low levels of income.

The survey drew a nationally representative sample of 3373 urban and rural households spread among 274 villages or 'wards'. As with other LSMS surveys, data coverage is quite comprehensive. In each household, a representative of the household – usually the head – was asked for his or her opinion regarding the family's standard of living. Six questions were asked regarding the adequacy of food consumption, housing, clothing, health care, schooling, and total income. The exact wording of the first question is 'Concerning [your family's food consumption over the past one month], which of the following is true? (1) It was less than adequate for your family needs; (2) It was just adequate for your family's needs; (3) It was more than adequate for your family's needs'. In the other five questions, the expression in square brackets is replaced by [your family's housing], [your family's clothing], [the health care your family gets], [your children's schooling] and [your family's total income over the past one month]. Nowhere do the questions refer to other villagers or imply a comparison with others: adequacy is defined relative to the respondent's needs.[15] Of course respondents may judge the adequacy of their consumption relative to the consumption of others, but this is precisely the point of our analysis.[16]

Answers to the consumption adequacy questions are summarized in Table 1. They are taken as measure of $V_{ik}^h$ in the empirical analysis. The overall dissatisfaction of respondents with their consumption level is striking. About 69% of respondents state that their income is less than adequate for their family needs. Food consumption

[14] Expanding Eq. (2.9) to include a cross term of the form $\varphi \log c_h \log \overline{c}_h$ would allow consumption behavior to vary with average consumption $\overline{c}_h$, and hence to test whether certain components of consumption are conspicuous in the sense that higher consumption by others raises one's consumption level. This is left for future research.

[15] In the instructions for enumerators, we read: .Adequate means no more nor less than what the respondent considers to be the minimum consumption needs of the family.

[16] Much of the literature on subjective welfare has focused on answers to the subjective well-being question 'How happy, satisfied, or pleased have you been with your personal life during the past month?' Answers to the subjective well-being question are likely to be affected by factors .e.g., mental and physical health, family situation, divorce .that are distinct from the satisfaction people derive from material goods and services. The consumption adequacy questions are closer in spirit to a utilitarian concept of welfare and are probably a better measure of utility. For this reason, they are a more appropriate choice to test rival preferences in the economic sense. It would be interesting to test rival preferences using answers to both types of questions and compare the results. Unfortunately the subjective well-being question was not asked in the Nepal LSMS.

Table 1
Answers to income and consumption adequacy questions

| | Percentage of responses: | | |
|---|---|---|---|
| | Less than adequate | Adequate | more than adequate |
| Total income | 68.7% | 30.6% | 0.7% |
| Food consumption | 46.6% | 51.4% | 2.0% |
| Clothing | 52.7% | 46.9% | 0.3% |
| Housing | 58.8% | 41.0% | 0.1% |
| Schooling | 52.6% | 47.1% | 0.3% |
| Health care | 52.0% | 47.9% | 0.1% |
| Number of observations | 3317 | | |

received the best rating, with 47 percent of respondents judging it less than adequate. Around the same period the poverty head count ratio in Nepal was estimated to be 42% (The World Bank 1999). In the other consumption categories (e.g. income, clothing, housing, schooling, health care), more than half of the households feel that their consumption is less than what they consider to be the minimum needs of the household.

Table 2 reports summary statistics for various regressors entering our analysis. The total consumption expenditure of the household $X_{ik}$ is computed by adding all expenditures on durable and non-durable goods. Consumption provides a more accurate measure of relative ranking because it fluctuates less than income. Consumption expenditures are reported on an annualized basis and have been converted into US$ equivalent. We see that there is a lot variation across households and that the distribution of consumption expenditures is skewed, with a median well below the mean. The distribution of wealth is even more skewed: the median value of assets is only 25% of the mean. The mean walking time between the household and the nearest nearby market is a little over two hours, with a median of 1 h. But some households are located as much as 30 h walk from the nearest market. Average household size and composition are normal for this kind of data. One household in six is headed by a woman.

The second panel of Table 2 reports ward characteristics. Inequality is measured as the Gini coefficient of per capita consumption across households, computed using survey data. There is quite a bit of variation in Gini coefficients across wards, which should help identify inequality effects. Using information compiled by Fafchamps and Shilpi (2003) on the road distance between each ward and each of 34 Nepalese towns, we construct a variable that represent the total urban population living within 2 h of travel distance from the ward. Population figures come from the 1991 census. Following Fafchamps and Shilpi (2005), population density in the district is used as additional control for isolation. The survey did not collect extensive price data. We have information on rice prices at the household level, from which we compute a ward-level median. The median wage rate in the ward is similarly computed from responses of individual household members about wage rates from wage employment in agriculture and non-agriculture. It is used as an additional proxy for the local price level.

## 4. Empirical analysis

We now implement the testing strategy outlined in Section 2. In all cases we investigate the robustness of our results to alternative specifications. At the end of the section, as an additional robustness test, we briefly investigate possible reasons for our findings.

### 4.1. Testing relative consumption

We begin by estimating Eq. (2.1)

$$V_{ik}^h = \alpha_h x_{ik} - \beta_h x_k + \gamma_h z_{ik}$$

with a small set of controls $z_{ik}$ — regional dummies[17] and the (log of the) ward average distance to the nearest market. We estimate one regression for each subjective adequacy question. Since dependent variables can take three ranked values, ordered probit is used as estimator.[18]

Results, shown in Table 3, indicate that relative income matters: the coefficient of average ward consumption $x_k$ is negative and strongly significant in all regressions. This means that, keeping own consumption constant, a household finds its consumption level less adequate if it lives in a ward where other households consume more.

The value of the relative consumption coefficient $\lambda_h \approx \beta_h/\alpha_h$ is reported at the bottom of the table. We see that $\lambda_h$ is highest for housing and health care and lowest for food and clothing. Except for housing where $\lambda_h$ is significantly greater than one, we cannot reject the pure relative consumption hypothesis that $\alpha=\beta$ and $\lambda=1$ in the other five regressions. Using formula (13) we find a weighted average value of $\lambda=0.97$, very close to 1. This is larger than $\lambda_h$ in the total income adequacy regression,

[17] Five regional dummies capturing East–West variation, and three dummies capturing elevation - which also corresponds to a North–South divide.

[18] Given that so few answers fall in the upper category, virtually identical results are obtained if we divide the data into less than adequate and adequate and use logit or probit.

Table 2
Household and ward characteristics

| Household characteristics | Unit | Mean | Median | S.D. | Min | Max |
|---|---|---|---|---|---|---|
| Total annual consumption expenditures | US$ | 862 | 563 | 1015 | 29 | 19940 |
| Total value of assets | US$ | 9910 | 2445 | 29854 | 0 | 714789 |
| Travel time to nearest local market | Hours | 2.18 | 1.06 | 3.36 | 0.01 | 40.00 |
| Number of household members | Number | 5.6 | 5.0 | 2.8 | 1.0 | 29.0 |
| Share of adult females in the household | Share | 0.26 | 0.25 | 0.16 | 0.00 | 1.00 |
| Share of children aged 6 and under | Share | 0.15 | 0.13 | 0.16 | 0.00 | 0.67 |
| Share of youths aged 7 to 20 | Share | 0.32 | 0.33 | 0.22 | 0.00 | 1.00 |
| Share of members aged 65 and above | Share | 0.04 | 0.00 | 0.13 | 0.00 | 1.00 |
| % households with female head | | 13.6% | | | | |
| Age of household head | Years | 44.8 | 43.0 | 14.4 | 11.0 | 92.0 |
| Years of schooling of head's father | Years | 0.9 | 0.0 | 2.5 | 0.0 | 16.0 |
| % holds in which head's father had non-farm job | | 17.0% | | | | |
| Number of households | | 3337 | | | | |
| Ward characteristics | | | | | | |
| Inequality in per capita consumption | Gini coef. | 0.257 | 0.246 | 0.082 | 0.091 | 0.509 |
| Urban population within 2 hours travel time | Thousands | 128.0 | 0.0 | 218.0 | 0.0 | 795.0 |
| Population density in the district | per km$^2$ | 383 | 185 | 483 | 2 | 1692 |
| Median rice price in ward | US$/kg | 0.44 | 0.44 | 0.14 | 0.12 | 1.04 |
| Median wage rate in ward | US$/day | 0.75 | 0.48 | 1.01 | 0.00 | 12.35 |
| Average Consumption expenditure | US$ | 862 | 643 | 651 | 202 | 4630 |
| Median Consumption Expenditure | US$ | 724 | 526 | 502 | 183 | 2803 |
| Average distance to nearest market | Hours | 2.18 | 1.12 | 2.91 | 0.12 | 24.20 |
| Average rainfall in ward | mm | 1702 | 1459 | 612 | 1039 | 3431 |
| Standard deviation of rainfall in ward | mm | 411 | 366 | 197 | 176 | 903 |
| Number of wards | | 274 | | | | |

which is 0.77.[19] The difference, however, is not significant at 10% level ($P$-value=.24).

In their study of subjective well-being the US, Blanchflower et al. (2004) find a λ estimate of about 40%. Our estimate is much larger.[20] The difference may be due to the fact that we are testing the presence of rivalry at a much smaller geographical scale. In Blanchflower and Oswald, $\bar{X}_k$ represents average income in the state, while in our case it represents average income in the ward. Another possible explanation for the discrepancy is that the two studies use different subjective welfare questions: Blanchflower et al. (2004) base their analysis on the subjective well-being question, we use consumption adequacy questions. It is conceivable that answers to the latter are more conducive to interpersonal comparisons than the first, and therefore result in a larger rivalry effect. There nevertheless remains the possibility that the results presented in Table 3 overestimate $\lambda$. Taken literally, our results indeed imply that doubling all incomes would leave subjective consumption adequacy unchanged — and may even lower it for some goods with $\lambda_h > 1$.

To investigate this troubling possibility, we first regress $V^h$ directly on $x_k$ to ascertain if subjective welfare indeed falls with average income. Non-parametric regression results – not shown here to save space – indicate instead a strong positive monotonic relationship between $V^h$ and $x_k$.

This suggests that perhaps our results are affected by measurement error. Indeed, household expenditures are notoriously difficult to measure, particularly in poor countries. Because of averaging, the variance of measurement error is larger in $x_{ik}$ than in $x_k$. The resulting attenuation bias should therefore be stronger for $x_{ik}$ than for $x_k$, thereby leading to an overestimation of $\lambda_h$. To correct for this, we instrument $x_{ik}$ and $x_k$. The instrumenting regressions for $x_{ik}$ and $x_k$ are shown in Table A1 in Appendix. Household background variables are used as instruments, such as the education level of the head's father and non-farm occupation dummies for the head's father and mother. We also interact these variables with the average and standard deviation of local rainfall to

[19] In the surveyed population, average expenditure shares are as follow: food 66.3%; clothing 8.1%; housing 12.2%; schooling 2.8%; health 3.4%; other 7.2%. Adequacy questions thus cover items representing 92.8% of total consumption. Since we do not have an adequacy question for other goods, we ignore them in the calculation and renormalize shares to sum to 1. This is equivalent to assuming average subjective adequacy for other goods.

[20] They are closer to the estimates reported by Luttmer (2005).

Table 3
Relative consumption and subjective consumption adequacy

| | Subjective adequacy of: | | | | | |
|---|---|---|---|---|---|---|
| | Food | Clothing | Housing | Schooling | Health care | Income |
| Consumption expenditures (log) | 0.725 (14.35)*** | 0.628 (12.49)*** | 0.450 (9.36)*** | 0.481 (8.49)*** | 0.337 (6.56)*** | 0.474 (9.20)*** |
| Ward mean consumption (log) | −0.619 (4.17)*** | −0.502 (3.63)*** | −0.681 (4.89)*** | −0.581 (3.81)*** | −0.479 (3.01)*** | −0.363 (2.81)*** |
| Ward mean distance to market (log) | −0.409 (7.68)*** | −0.403 (7.92)*** | −0.369 (6.92)*** | −0.434 (7.91)*** | −0.567 (8.95)*** | −0.258 (5.32)*** |
| Regional dummies | Included but not shown | | | | | |
| Intercept | −0.999 (0.69) | −1.297 (0.95) | 2.280 (1.61) | 0.942 (0.63) | 1.290 (0.80) | −1.694 (1.39) |
| Number of observations | 3089 | 3087 | 3086 | 2486 | 3069 | 3080 |
| $\lambda$ | 0.85 | 0.80 | 1.51 | 1.21 | 1.42 | 0.77 |
| Testing whether $\alpha=\beta$ (or $\lambda=1$) | | | | | | |
| Chi square statistic | 0.59 | 0.93 | 2.91 | 0.49 | 0.86 | 0.91 |
| $p$-value | 0.44 | 0.33 | 0.09 | 0.48 | 0.35 | 0.34 |

Absolute value of $t$ statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.

capture the idea that the value of farming experience – which is partly inherited from parents (Rosenzweig et al., 1985) – depends on local climate conditions. These variables should not affect subjective consumption adequacy except through expenditures. As shown at the bottom of the table, instruments are jointly significant. They also pass standard specification tests, shown at the bottom of Table 4. For readers who are weary of instrumental variables in general, we should emphasize that the only qualitative result that is affected by instrumentation is the magnitude of $\lambda_h$; all other results are basically the same whether we instrument or not.

Eq. (2.1) is reestimated with instrumented $x_{ik}$ and $x_k$.[21] To minimize omitted variable bias, we also add a series of individual controls, such as household size and composition, age and age squared, median wage and rice price, and a female head dummy. Because of household public goods, there is no commonly accepted way of computing the number of adult equivalent units with which to divide consumption (e.g. Deaton and Paxson, 1998; Gan and Vernon, 2003). We therefore err on the side of caution and include as additional regressors not only the number of household members (in log since consumption is itself in log) but also detailed information on household composition, measured as share of household members in various age-gender categories. We also add population density, ward inequality, and urban population within 2 h travel time to control for local conditions that may be correlated with ward consumption levels.

Regression results are shown in Table 4. Consistent with the presence of measurement error, we note a massive increase in the $x_{ik}$ and $x_k$ coefficients. The implied value of $\lambda_h$ falls in all cases except for food. Except for health care, parameter $\lambda_h$ is now less than 1 in all cases — significantly so for clothing and schooling.[22] Using formula (13) we obtain an average $\lambda=0.83$, not significantly different from the $\lambda_h$ for total income, which is 0.73.

[21] Since the estimator is a maximum likelihood estimator based on the normal distribution (i.e., ordered probit), we follow the instrumentation method suggested by Smith and Blundell (1986) and Anderson and Hsiao (1982) and include the residuals from the instrumenting regression as additional regressors.

[22] As is clear from the discussion in Section 2, estimation of $l_h$ from regression results rests on the assumption that consumption decisions are choice variables. In the presence of quantity rationing, approximation (2.11) overestimates $l_h$, a point made in a related context by Fafchamps and Shilpi (2005). Given that health provision is partly subsidized, quantity rationing is likely.

Table 4
Relative consumption effect with additional controls and instrumented consumption

| | Subjective adequacy of: | | | | | |
|---|---|---|---|---|---|---|
| Consumption | Food | Clothing | Housing | Schooling | Health care | Income |
| Consumption expenditures (log) (*) | 1.7950 (4.74)*** | 2.3278 (6.59)*** | 1.5144 (4.64)*** | 1.8978 (5.00)*** | 1.0880 (3.22)*** | 1.1660 (3.43)*** |
| Ward mean consumption (log) (*) | −1.5900 (4.75)*** | −1.2680 (4.50)*** | −1.0506 (3.50)*** | −1.1993 (3.43)*** | −1.2273 (3.87)*** | −0.8569 (2.90)*** |
| Household controls | | | | | | |
| Value of assets (log) | 0.0878 (2.03)** | −0.0154 (0.42) | 0.0074 (0.20) | −0.0120 (0.30) | 0.0414 (1.14) | 0.0597 (1.56) |
| Household size (log) | −1.0684 (4.46)*** | −1.3709 (6.07)*** | −0.8490 (3.96)*** | −1.2101 (5.01)*** | −0.6123 (2.75)*** | −0.6712 (3.09)*** |
| Share of adult females | 0.0068 (0.02) | 0.3583 (1.24) | 0.0187 (0.07) | 0.5188 (1.51) | 0.0210 (0.07) | −0.0826 (0.27) |
| Share of children 6 and under | 0.2667 (0.79) | 1.1977 (3.24)*** | 0.2164 (0.65) | 1.1669 (2.91)*** | 0.0586 (0.17) | −0.0072 (0.02) |
| Share of youths aged 7 to 20 | −0.0488 (0.19) | 0.2802 (1.10) | −0.1689 (0.68) | 0.6900 (2.45)** | −0.1029 (0.42) | −0.4244 (1.61) |
| Share of elderly 65 and above | −0.3935 (1.30) | 0.3364 (1.04) | 0.0345 (0.11) | 0.3519 (0.83) | −0.3705 (1.31) | 0.0709 (0.22) |
| Age of household head | −0.0203 (1.70)* | −0.0003 (0.02) | −0.0168 (1.47) | −0.0365 (2.73)*** | −0.0153 (1.29) | −0.0012 (0.10) |
| Age of household head squared | 0.0002 (1.79)* | 0.0000 (0.07) | 0.0002 (1.45) | 0.0004 (2.66)*** | 0.0001 (1.13) | −0.0000 (0.17) |
| Female head dummy | −0.0869 (0.89) | −0.0737 (0.77) | −0.0126 (0.13) | −0.1280 (1.18) | −0.0304 (0.31) | −0.1003 (1.01) |
| Ward variables | | | | | | |
| Ward mean distance to market (log) | −0.2988 (4.18)*** | −0.0954 (1.34) | −0.1104 (1.44) | −0.2007 (2.52)** | −0.3535 (4.29)*** | −0.0722 (1.03) |
| Gini coef. of per capita consumption | 0.0799 (0.14) | 0.5746 (1.09) | 0.3799 (0.68) | 1.0386 (1.69)* | 0.4718 (0.85) | 0.0407 (0.08) |
| Urban population within 2 hrs travel time | 0.8527 (2.89)*** | 0.9422 (3.47)*** | 1.8024 (4.89)*** | 1.0873 (3.19)*** | 1.2374 (3.04)*** | 0.9476 (3.27)*** |
| Population Density (per sqkm) | 0.0006 (3.81)*** | 0.0003 (2.02)** | −0.0004 (2.15)** | 0.0001 (0.59) | 0.0002 (1.15) | −0.0000 (0.18) |
| Median wage rate in ward (log) | −0.2423 (2.01)** | −0.1382 (1.43) | −0.1157 (1.04) | −0.1918 (1.62) | 0.0733 (0.65) | 0.0740 (0.72) |
| Median rice price in ward (log) | −0.0701 (0.41) | 0.0463 (0.30) | 0.3597 (2.17)** | −0.0059 (0.03) | 0.2702 (1.57) | −0.0335 (0.24) |
| Regional dummies | Included but not shown | | | | | |
| Intercept | −0.1116 (0.04) | −8.7991 (3.00)*** | −3.9823 (1.27) | −4.5717 (1.33) | 0.8761 (0.27) | −3.2380 (1.11) |
| Number of observations | 2894 | 2893 | 2891 | 2336 | 2876 | 2886 |
| $\lambda$ | 0.89 | 0.54 | 0.69 | 0.63 | 1.13 | 0.73 |
| Testing whether $\alpha=\beta$ | | | | | | |
| Chi square statistic | 0.28 | 8.25 | 1.48 | 2.84 | 0.12 | 0.74 |
| *p*-value | 0.60 | 0.00 | 0.22 | 0.09 | 0.73 | 0.39 |
| Overidentification test | | | | | | |
| Hansen-J statistic | 14.46 | 11.31 | 15.71 | 16.70 | 18.81 | 13.76 |
| *p*-value | 0.34 | 0.58 | 0.26 | 0.21 | 0.13 | 0.39 |
| Validity of instruments | | | | | | |
| Anderson–Rubin LR Statistic | 115.00 | 114.93 | 112.40 | 79.34 | 115.97 | 111.42 |
| *p*-value | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Absolute value of t statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.
(*) instrumented –– see Table A1 for the instrumenting regression.

Several control variables have the anticipated effect. As shown by Fafchamps and Shilpi (2005), subjective consumption adequacy is strongly affected by isolation, as indicated by the strong significance of the urban proximity and population density variables. Household size has a negative sign, as predicted by theory. Contrary to some beliefs, ward inequality, measured by the Gini coefficient of per capita consumption expenditure, is shown to have no systematic effect on subjective consumption adequacy.[23] Given that $\lambda_h \approx 1$ for most goods, it is not surprising that prices have no systematic significant effect one way or another. Indeed we saw in Eq. (2.10) that when $\lambda_h = 1$, the price term disappears. It follows that our main results should not be affected by the fact that we do not have complete price information.[24]

So far we have used mean consumption levels in the ward to investigate the effect of relative consumption. As a statistic, the mean is sensitive to the presence of outliers. It is therefore conceivable that results are driven by a few very rich individuals who raise the average in some wards but at the same time generate a lot of local resentment.[25] To investigate this possibility, we reestimate the regression shown in Table 4 replacing mean ward consumption with the median. Results are shown in the second panel of Table 5. To facilitate comparison, the first panel reproduces relevant results from Table 4. Apart from the median, other regressors are the same as in Table 4 but are not shown here to save space. Median ward consumption is instrumented in the same manner as the ward average. The instrumenting regression is shown in Table A1 in Appendix. If subjective welfare is only affected by the presence of a few rich individuals, negative feelings should disappear once we replace the mean by the median. This is not the case: coefficient estimates for the median are virtually identical to those for the mean reported in Table 4.

We also investigate whether similar results obtain when $x_k$ is replaced by the rank $r_{ik}$ of household $i$'s consumption expenditures in ward $k$. Results are shown in the third panel of Table 5. The coefficient of own consumption in the rank regression needs to be compared with the tests of whether $\alpha = \beta$ in the other two regressions. With this caveat, results are similar. Comparing the log-likelihood values obtained in the three sets of regressions, we see that in four out of six regressions higher values are obtained using mean consumption rather than median or rank. The mean is thus a slightly better specification.

### 4.2. Relative consumption and poverty

Next we investigate whether sensitivity to relative consumption is stronger among the non-poor, as argued by Ravallion and Lokshin (2005). We begin by estimating model (4) with an interaction term $x_{ik}x_k$. We report in Table 6 uninstrumented results without additional controls — i.e., the same regression as in Table 3 except for the added interaction term. Contrary to expectations, we find that, if anything, those with are non-poor in an absolute sense care less about relative consumption: the interaction coefficient $\beta_1 > 0$ in all six regressions, significantly so in three. This result is not robust, however, as it disappears once we instrument — perhaps because of multicollinearity.

We also estimate model (5) to test whether the non-poor in a relative sense care more about relative consumption. Results are summarized in Table 7. All regressors are as in Table 4. To save space we only show the parameters of interest $\theta_l$ and $\theta_u$ and the result of a Wald test of whether they are equal. In none of the regressions can we reject the hypothesis that $\theta_l = \theta_u$.

To investigate this issue further, we also estimate Eq. (2.6) in semi-parametric manner, controlling for all the variables appearing in Table 4 in a linear way, but letting relative expenditure $x_{ik} - x_k$ enter non-parametrically. Results are shown in Fig. 1. As is typical with non-parametric regressions, we have little precision at either ends. Apart from that, it is immediately apparent that the relationship between consumption adequacy and relative expenditure is monotonic and fairly linear. The only possible exception is food consumption for which linearity breaks down at high levels of relative income. Taken together, these results suggest that the poor and the non-poor care more or less equally about their relative position when assessing the adequacy of their consumption level.

[23] The Gini coefficient is marginally significant in the schooling regression, but with the wrong sign. This suggests, if anything, that more inequality raises subjective welfare. This is probably a statistical artifact.

[24] We found further confirmation of this by experimenting with an indicator of housing costs. This indicator is obtained by estimating a hedonistic log price regression for housing, controlling for various observable house attributes. District dummies in this regression are taken as estimates of district specific price premia, which presumably capture the value of amenities and other location specific factors. As predicted by Eq. (2.10), this housing price indicator is nearly never significant and adding it to the regression does not change any of the results.

[25] While this would not invalidate the relative consumption hypothesis, we nevertheless would like to know whether feelings of inadequacy only come from a few rich individuals. If this were the case, it could presumably be construed as a justification for eliminating extreme wealth disparities (e.g., through taxation or land reform). Macours (2006) shows that the Maoist insurrection that started in the late 1990's concentrate in districts where returns to land grew the most, fueling income disparities between landed and landless households.

Table 5
Comparing different models

| | Subjective adequacy of: | | | | | |
|---|---|---|---|---|---|---|
| A. Using ward mean consumption | Food | Clothing | Housing | Schooling | Health care | Income |
| Consumption expenditures (log) (*) | 1.7950 (4.74)*** | 2.3278 (6.59)*** | 1.5144 (4.64)*** | 1.8978 (5.00)*** | 1.0880 (3.22)*** | 1.1660 (3.43)*** |
| Ward mean consumption (log) (*) | −1.5900 (4.75)*** | −1.2680 (4.50)*** | −1.0506 (3.50)*** | −1.1993 (3.43)*** | −1.2273 (3.87)*** | −0.8569 (2.90)*** |
| Other regressors | as in Table 4 | | | | | |
| Log-likelihood | −1597.37 | −1604.77 | −1676.20 | −1329.41 | −1603.72 | −1548.13 |
| B. Using ward median consumption | | | | | | |
| Consumption expenditures (log) (*) | 1.8293 (4.59)*** | 2.3803 (6.45)*** | 1.5835 (4.62)*** | 1.9775 (4.98)*** | 1.2786 (3.63)*** | 1.2184 (3.47)*** |
| Ward median consumption (log) (*) | −1.5911 (4.45)*** | −1.3156 (4.39)*** | −1.1218 (3.44)*** | −1.3011 (3.44)*** | −1.4753 (4.38)*** | −0.9145 (2.90)*** |
| Other regressors | as in Table 4 | | | | | |
| Log-likelihood | −1601.08 | −1612.01 | −1682.30 | −1334.65 | −1601.87 | −1547.08 |
| C. Using ward rank in consumption | | | | | | |
| Consumption expenditures (log) (*) | 0.1404 (0.35) | 0.9760 (2.61)*** | 0.4081 (1.06) | 0.6082 (1.46) | −0.2573 (0.64) | 0.2578 (0.71) |
| Ward rank in consumption (*) | 0.2529 (4.84)*** | 0.2089 (4.55)*** | 0.1731 (3.49)*** | 0.2010 (3.63)*** | 0.2219 (4.31)*** | 0.1467 (3.18)*** |
| Other regressors | as in Table 4 | | | | | |
| Log-likelihood | −1600.64 | −1614.95 | −1683.53 | −1333.78 | −1603.28 | −1544.00 |

Absolute value of t statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.
(*) instrumented –– see Table A1 for the instrumenting regression.

Table 6
Absolute poverty and relative consumption

| | Subjective adequacy of: | | | | | |
|---|---|---|---|---|---|---|
| | Food | Clothing | Housing | Schooling | Health care | Income |
| Consumption expenditures (log) | −0.976 (0.82) | −3.907 (3.24)*** | −0.675 (0.56) | −3.127 (2.53)** | −4.371 (3.28)*** | −1.248 (1.09) |
| Ward mean consumption (log) | −2.292 (1.94)* | −4.977 (4.13)*** | −1.792 (1.50) | −4.155 (3.30)*** | −5.121 (3.90)*** | −2.066 (1.82)* |
| Ward consumption (log)* | 0.161 | 0.430 | 0.106 | 0.341 | 0.447 | 0.163 |
| household consumption (log) | (1.41) | (3.74)*** | (0.93) | (2.90)*** | (3.53)*** | (1.50) |
| Ward mean distance to market (log) | −0.399 (7.38)*** | −0.379 (7.46)*** | −0.362 (6.69)*** | −0.418 (7.69)*** | −0.545 (8.68)*** | −0.248 (5.04)*** |
| Regional and belt dummies | included but not shown | | | | | |
| Intercept | 16.642 (1.35) | 45.861 (3.64)*** | 14.010 (1.12) | 38.739 (2.94)*** | 50.191 (3.63)*** | 16.309 (1.36) |
| Number of observations | 3089 | 3087 | 3086 | 2486 | 3069 | 3080 |

Absolute value of t statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 7
Relative poverty and relative consumption

| | Subjective adequacy of: | | | | | |
|---|---|---|---|---|---|---|
| | Food | Clothing | Housing | Schooling | Health care | Income |
| Relative income, if below mean (*) | 1.6792 | 1.3245 | 1.0362 | 1.1685 | 1.1666 | 0.8438 |
| | (5.10)*** | (4.59)*** | (3.45)*** | (3.35)*** | (3.66)*** | (2.81)*** |
| Relative income, if above mean (*) | 1.4278 | 1.1660 | 1.1004 | 1.2600 | 1.3380 | 0.8806 |
| | (3.93)*** | (3.82)*** | (3.33)*** | (3.33)*** | (3.88)*** | (2.78)*** |
| Other regressors | same as in Table 4 | | | | | |
| Number of observations | 2894 | 2893 | 2891 | 2336 | 2876 | 2886 |
| Testing whether $\theta u = \theta l$ | | | | | | |
| Chi square statistic | 1.79 | 0.71 | 0.12 | 0.20 | 0.90 | 0.04 |
| *p*-value | 0.18 | 0.40 | 0.73 | 0.66 | 0.34 | 0.85 |

Absolute value of t statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.
(*) instrumented –– see Table A1 for the instrumenting regression.

### 4.3. Relative consumption and market isolation

We now examine the data for any evidence of a relationship between sensitivity to relative consumption and isolation from markets. One hypothesis is that market interaction heightens feelings of rivalry because it brings people in competition with each other (e.g. Scott, 1976; Inglehart and Klingemann, 2000) and provides strong incentives (Fehr and Falk, 2002). In contrast, as argued by Ravallion and Lokshin (2005) and others (e.g. Ravallion and Dearden, 1988; Cox, 1987), village life is characterized by risk sharing practices that foster a sense

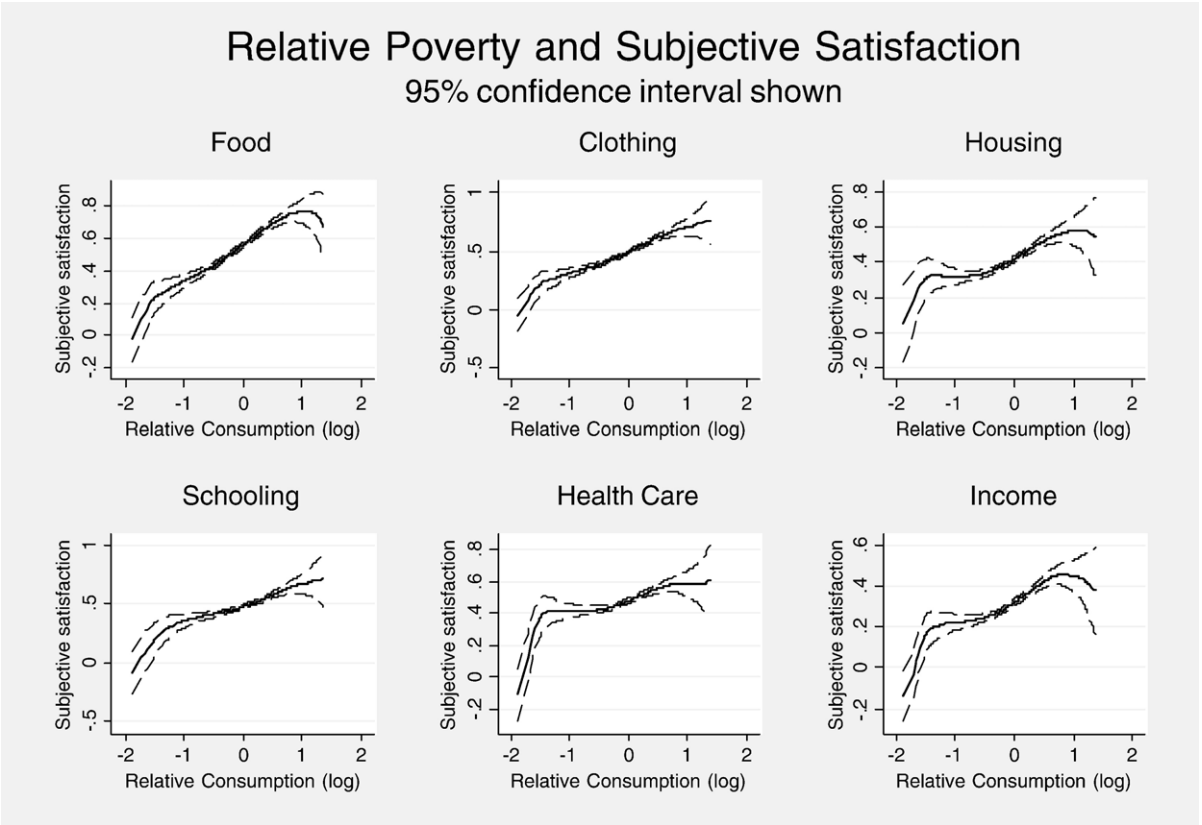


Fig. 1. Relative poverty and subjective satisfaction.

of community. Let us call this the convivial village hypothesis. According to this hypothesis, concerns with relative consumption increase with market interaction.

An alternative hypothesis is that 'invidious preferences' – to take the phrase coined by Curtis and Eswaran (2003) – are an innate human trait, perhaps inherited through a process of evolutionary selection. Because of repeated interaction over decades, village life focuses rivalry onto immediate neighbors. In contrast, people who live closer to the market learn to accept income differences, for instance because of the opportunities for social mobility that the market brings. We call this the invidious village hypothesis.

To test these hypotheses, we begin by estimating regression model (7):

$$V_{ik} = \alpha x_{ik} - \beta_0 x_k + \beta_1 d_k x_k + \delta d_k + \gamma z_{ik}$$

To proxy for interaction with the market, we use two variables: (the log of) travel time to the nearest market, averaged over all sample households in the ward; and a dummy variable that takes value 1 if the household has a migrant member working elsewhere. Coefficient estimates are shown in Table 8. We find a negative coefficient on the distance interaction term in all regressions, significant at the 10% level or better in five. To visualize what these results mean, we plot $\partial V_{ik}/\partial x_k = -\hat{\beta}_0 + \hat{\beta}_1 d_k$ in Fig. 2. We see that $\partial V_{ik}/\partial x_k$ becomes more negative as distance from the nearest market increases. We also find a positive and significant interaction coefficient for migrants in the clothing and housing regressions. This suggests that households with a migrant member judge the adequacy of their clothing and housing consumption level less in relation with immediate neighbors than households without a migrant member.

The convivial village hypothesis is thus rejected: households residing close to markets judge the adequacy of their consumption pattern less in reference to their immediate neighbors than households residing in isolated wards. We also run an $F$-test of whether $\beta=0$ for very short distances from the market, i.e., for the smallest value of log distance to the nearest market, which is −2.25. Except for housing and schooling, we fail to reject the null hypothesis that $\beta=0$ at the 5% level; $\hat{\beta}$ only becomes significant for households living far enough from the nearest market.

To investigate the robustness of these findings, we investigate whether similar results are obtained when we interact $x_k$ with ownership of a radio or telephone. The idea behind this test is that ownership of a radio or telephone proxies for an interaction with the world outside the village but does not imply market exchange. We find similar results when the variable is used in isolation. But coefficients become non-significant once we introduce the interacted migrant dummy. This seems to suggest that simple exposure to the rest of the world does not suffice; market interaction is necessary to reduce people's tendency to draw comparisons with neighbors when assessing the adequacy of their consumption level.

### 4.4. Interpretation

While we are able to reject the convivial village hypothesis, should we accept the invidious village hypothesis? Are people living isolated from markets intrinsically more sensitive to income differences? An answer to this question ultimately rests on why people care about relative consumption. While this question is best addressed in an experimental – or perhaps clinical – setting, we can nevertheless investigate some possibilities indirectly.

One possibility, suggested by an anonymous referee, is that people are concerned about their children. Because of assortative matching in the marriage market, the future welfare of their offspring partly depends on the relative ranking of their parents around the time of marriage. This is a priori plausible.[26] It may also explain why isolated households appear more concerned about relative consumption. It is reasonable to assume that the marriage market is geographically more diverse in and around markets because of higher population mobility. In that case, the parents' ranking relative to their neighbors should be a stronger determinant of matrimonial success in isolated communities than in market towns.

We wish to test whether concerns for relative consumption are driven by marriage market consideration. If this is the case, only parents with children of marrying age should display signs of invidious comparisons. We therefore add to our regression an interaction term $x_k M_i$ where $M_i=1$ if the household has children of marrying age (defined as any resident child aged 12 and above), and $M_i=0$ otherwise. We also investigate alternative specifications where we focus on daughters only, given the importance of dowry in the survey area. In both cases, $M_i$ enters as a separate regressor as well. If marriage market considerations fully account for invidious comparisons, we should observe a negatively significant coefficient on $x_k M_i$ and, controlling for $x_k M_i$, a 0 coefficient on $x_k$.

[26] Fafchamps and Quisumbing (2005), for instance, provide evidence that parents make strategic bequests to their daughter if doing so improves their matrimonial prospects.

Table 8
Relative consumption and market isolation

| | Subjective adequacy of: | | | | | |
|---|---|---|---|---|---|---|
| | Food | Clothing | Housing | Schooling | Health care | Income |
| Consumption expenditures (log) (*) | 2.1610 (4.55)*** | 2.6827 (5.82)*** | 1.8008 (3.96)*** | 2.3173 (4.58)*** | 1.5432 (3.39)*** | 1.5313 (3.54)*** |
| Ward mean consumption (log) (*) | −1.8444 (4.58)*** | −1.5306 (4.42)*** | −1.3678 (3.57)*** | −1.5833 (3.83)*** | −1.6812 (4.20)*** | −1.0632 (3.01)*** |
| Ward consumption* ward distance (*) | −0.2186 (2.36)** | −0.2699 (3.06)*** | −0.0687 (0.63) | −0.1547 (1.46) | −0.2419 (2.35)** | −0.1290 (1.43) |
| Ward consumption* migrant dummy (*) | 0.1898 (0.95) | 0.4356 (2.37)** | 0.2504 (1.42) | 0.0408 (0.19) | 0.0135 (0.07) | 0.0028 (0.02) |
| Ward mean distance to market (log) | 2.1908 (2.20)** | 2.9382 (3.20)*** | 0.6355 (0.56) | 1.4856 (1.34) | 2.1294 (1.98)** | 1.5523 (1.63) |
| Migrant dummy | −2.9418 (1.55) | −5.3562 (3.15)*** | −3.7047 (2.34)** | −1.9273 (0.92) | −2.2037 (1.17) | −0.8336 (0.53) |
| Other regressors | as in Table 4 | | | | | |

Absolute value of t statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.
(*) instrumented –– see Table A1 for the instrumenting regression.

Results, not shown here to save space, do not fit this pattern. While the estimated coefficients of $x_k M_i$ are negative as expected, they are only marginally significant in a single regression, that for satisfaction with schooling. This probably captures concerns about the availability of secondary schools for teenage children, not marriage market considerations. Estimated coefficients for $x_k$ remain large in magnitude and strongly significant in all regressions, and we observe little change in the estimated coefficient of $d_k x_k$. Marriage market considerations cannot therefore explain why surveyed households care about relative consumption.

Another possibility, often put forth by psychologists, is that people derive satisfaction from their achievements and they judge their achievements in comparison to a reference group. Although the literature is not entirely clear as to how this reference group is constructed, it is often thought that people compare themselves to individuals who started in similar conditions, e.g., those they grew up with.[27] Evidence supporting this interpretation is provided by Kingdon and Knight (2004) who show that, in South Africa, people compare themselves to others within their racial group.

We do not have any direct measurement of respondents' reference group so we cannot test this idea directly. But we can investigate it indirectly as follows. Some 20% of surveyed household heads live in a district other than their birth district. To the extent that people judge their achievements relative to those they grew up with, these migrants may judge their economic success at least in part by comparing themselves to households in their place of origin. We can thus examine whether household heads born outside their district of current residence continue to compare themselves with households in their district of origin. To test this idea, we estimate a regression model of the form:

$$V_{ik} = \alpha x_{ik} - \beta_0 x_k - \beta_1 x_d^r - \beta_2 x_d^b + \gamma z_{ik}$$

where $x_d^b$ and $x_d^r$ denote the (log of the) average consumption in the districts of birth and residence, respectively. Average consumption in the district of residence is included to avoid spurious results.[28] In 80% of the observations, the district of residence and the district of birth are the same. Identification is thus achieved only thanks to migrants.

Results are presented in Table 9. All three consumption variables are instrumented to avoid measurement error. We only show the coefficients of interest; other regressors are the same as in Table 8. We find that $\beta_0$ remains negative and significant as before, while $\beta_2$ is negative in all regressions and significant at the 10% level

[27] The reference group hypothesis could explain our invidious village result. To see how, imagine that immediate neighbors provide an approximation of the peer group that is better for isolated residents of mountain villages than for households living close to markets. In this case, a simple attenuation bias due to measurement error could account for our finding.

[28] In South Africa Kingdon and Knight (2004) indeed found that average consumption in the district of residence has a distinct significant effect on $V_{ik}$.

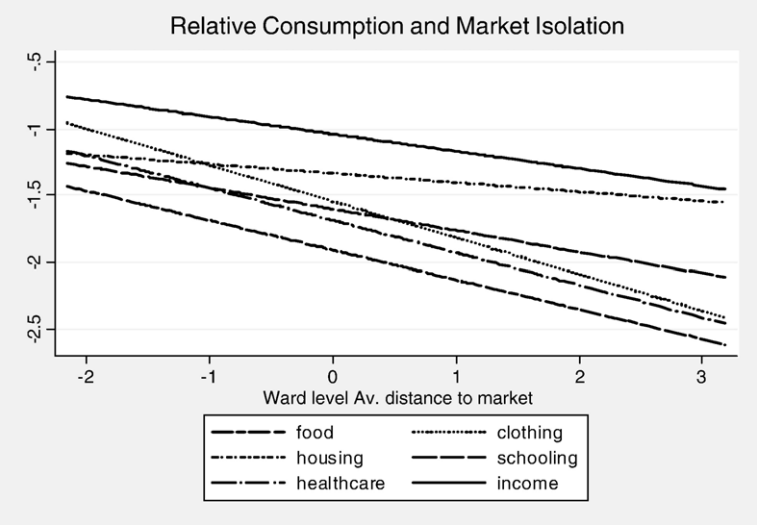


Fig. 2. Relative consumption and market isolation.

or better in five out of six. This suggests that migrants assess the adequacy of their consumption level partly in comparison with neighbors, partly in comparison with other households in their birth district. The only exception is housing for which respondents appear to compare themselves exclusively to households in their ward of residence. Taken together, these results are indicative of a reference group effect. Furthermore this reference group effect seems to vary as a result of interaction with the market — in this instance, migration which, for household heads, is nearly always work motivated.

We also find that, unlike in Kingdon and Knight (2004), adding $x_d^r$ does not reverse the sign of $\beta_0$. Coefficient $\beta_1$ is only significant in one regression – food – with a positive sign. Thus, contrary to the work of Kingdon and Knight, we find no evidence that surveyed villagers feel altruism towards their neighbors or that they derive utility from a shared public good such as mutual insurance.

## 5. Conclusion

The recent literature has shown that subjective welfare depends positively on one's own consumption but negatively on the average consumption level of others nearby (e.g. Easterlin, 2001; Blanchflower et al., 2004; Luttmer, 2005). Much of the research to date focuses on developed countries. Previous attempts to test this relationship in poor countries have yielded different

Table 9
Relative consumption and birth district

| | Subjective adequacy of: | | | | | |
|---|---|---|---|---|---|---|
| | Food | Clothing | Housing | Schooling | Health care | Income |
| Consumption expenditures (log) (*) | 2.1303 | 2.7492 | 1.8765 | 2.3814 | 1.5428 | 1.6921 |
| | (4.27)*** | (5.77)*** | (3.92)*** | (4.53)*** | (3.30)*** | (3.76)*** |
| Ward mean consumption (log) (*) | −1.9655 | −1.5578 | −1.3023 | −1.4958 | −1.6177 | −1.0371 |
| | (4.85)*** | (4.49)*** | (3.33)*** | (3.61)*** | (3.98)*** | (2.87)*** |
| Average consumption in district of residence (log) (*) | 0.6896 | 0.3707 | −0.1962 | −0.0484 | 0.0902 | 0.1437 |
| | (2.21)** | (1.25) | (0.64) | (0.15) | (0.30) | (0.48) |
| Average consumption in district of birth (log) (*) | −0.3546 | −0.5911 | −0.2149 | −0.3912 | −0.3596 | −0.5259 |
| | (1.70)* | (2.89)*** | (1.08) | (1.80)* | (1.77)* | (2.36)** |
| Other regressors | as in Table 8 | | | | | |

Absolute value of $t$ statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.
(*) instrumented –– see Table A1 for the instrumenting regression.

results, suggesting either that the consumption level of immediate neighbors has a positive effect on subjective welfare (Kingdon and Knight, 2004), or that only the non-poor care about their neighbors.consumption (Ravallion and Lokshin, 2005). These findings have cast some doubt on the generality of the influence of relative consumption on subjective welfare. They could also be taken to suggest that sensitivity to relative consumption is not an innate human trait but is fueled by economic development.

We revisit these issues using data from Nepal, a very poor country by world standards. We find that Nepalese households do not differ from their counterparts in more prosperous economies: their subjective assessment of the adequacy of their consumption increases with own consumption and falls with the average consumption of neighbors. The effect is robust, consistent across goods, and strong in magnitude — i.e., stronger than Blanchflower et al. (2004) but similar to Luttmer (2005). The effect is not due to aversion towards inequality, for which we control separately. For several expenditure categories we cannot reject the hypothesis that respondents only care about relative consumption. We find no evidence that poor households – in a relative or absolute sense – care less about relative consumption than more fortunate ones.

We look for tell-tale signs that interpersonal comparisons among neighbors are fueled by market interaction. Results show instead that respondents residing far from markets care more – not less – about the consumption level of their neighbors. Similarly, we find that households with a migrant member working elsewhere are less sensitive to the consumption level of their neighbors. These findings are inconsistent with the idea that interaction with the market is what makes people's subjective welfare sensitive to relative consumption.

Our results further show that household heads having migrated out of their birth district judge the adequacy of their consumption partly in comparison with households in their district of origin. This finding suggests that individuals judge the adequacy of their consumption in reference to others like them, and that the reference group changes as a result of market interaction — in this case, labor migration. In contrast, we find no evidence that invidious comparisons arise because households care the marriage market outcome of marrying age children.

This paper confirms that relative assessment affects subjective welfare even among poor households isolated from the market. This does not imply that eradicating absolute poverty is not a justified policy objective. As Sen and others have argued, the ethical and philosophical question of what constitutes a valid policy objective goes well beyond the summing up of individual utility functions (e.g. Duclos and Gregoire, 2002; Foster, 1998). Yet we should not ignore a reality that can account for important patterns of human behavior. One possibility is conspicuous consumption, as suggested by Veblen (1899) and Duesenberry (1949). Another is assortative residential choices, whereby people select a place of residence so as to minimize the subjective welfare loss from being surrounded by people richer than they are.[29] Some evidence to this effect has already been provided by Stark and Taylor (1991) who show that relative deprivation is a critical factor in the decision of Mexican households to send migrants abroad. More work is needed in this area.

Concerns for relative consumption may also affect voluntary contributions to public goods. For instance, in their book on the management of communal resources Baland and Platteau (1995) provide numerous examples of small communities unable to coordinate public good provision. In their analysis, the authors emphasize the deleterious effect of heterogeneity, a point they revisit in subsequent articles (e.g. Baland and Platteau, 1998, 1997, 1999). Even the strongest proponents of the convivial village ethos have voiced serious concerns about the social tensions created by inequality at the local level. Scott (1976), for instance, criticizes landlords and their lack of concern for tenants as a reason for the breakdown of – otherwise idealized – mutual insurance systems in South-East Asia. More ominous evidence can be found in Andre and Platteau (1998) who describe how, in Rwanda, severe tensions over land fueled violence among neighbors during the 1994 genocide. Macours (2006) similarly shows that the Maoist insurrection that flared up in Nepal in the late 1990's is concentrated in districts where returns to land have grown the most, raising income disparities between landed and landless households. In these examples, failure to contribute to public goods (common property resources, mutual insurance, rule of law) may have resulted at least in part from relative income considerations (e.g. Besley and Burgess, 2002; Strom, 1995). This point is related to the issue of fairness in games (e.g. Rabin, 1993; Kahneman et al., 1986, Fehr and Schmidt, 1999). These issues deserve more attention in research.

[29] Note that perfect assortative matching in residential choices would not invalidate our testing strategy but would make identification impossible. That identification is possible is, by itself, indirect evidence that assortative residential matching is not perfect in our study area.

# Appendix A

Table A1
Instrumenting regressions

| | | Individual consumption | Ward mean consumption | Median consumption | Rank of hh consumption | Relative consumption | Ward cons. * distance | Ward cons. * migrant |
|---|---|---|---|---|---|---|---|---|
| Instruments: | Used in: | Table 4 | Table 4 | Table 5 | Table 5 | Table 7 | Table 8 | Table 8 |
| Father's education (log) | | 0.1542 (4.16)*** | 0.0064 (0.24) | −0.0001 (0.00) | 0.9858 (3.97)*** | 0.1382 (3.99)*** | 0.1091 (0.11) | 0.6754 (1.71)* |
| Dummy=1 if father employed in non-farm job | | −0.0554 (0.81) | −0.0459 (0.96) | −0.0774 (1.51) | 0.1275 (0.30) | −0.0268 (0.46) | 1.1760 (0.87) | −0.7308 (1.02) |
| Dummy=1 if mother emplyed in non-farm job | | 0.0723 (0.66) | 0.0313 (0.30) | 0.0212 (0.15) | −0.0738 (0.17) | 0.0482 (0.84) | −14.6778 (4.55)*** | −1.0755 (1.55) |
| Rainfall * father's non-farm job dummy | | 0.0000 (0.57) | 0.0000 (0.49) | 0.0000 (1.16) | −0.0000 (0.08) | 0.0000 (0.30) | −0.0002 (0.11) | 0.0005 (1.12) |
| S.D. of rainfall*father non-farm job dummy | | 0.0001 (0.51) | 0.0000 (0.31) | −0.0000 (0.17) | 0.0003 (0.34) | 0.0001 (0.59) | −0.0019 (0.49) | −0.0005 (0.36) |
| Rainfall * father's education | | −0.0000 (1.32) | −0.0000 (1.51) | −0.0000 (1.19) | −0.0001 (0.69) | −0.0000 (0.23) | −0.0005 (0.77) | −0.0001 (0.27) |
| S.D. of rainfall*father's education | | 0.0001 (0.80) | 0.0001 (2.66)*** | 0.0002 (2.65)*** | −0.0003 (0.59) | −0.0001 (1.06) | 0.0006 (0.36) | −0.0004 (0.52) |
| Ward averages | | | | | | | | |
| Log(mean household size) | | 0.1244 (1.21) | 0.7458 (7.04)*** | 0.6727 (4.89)*** | −4.2229 (12.07)*** | −0.6364 (12.03)*** | 0.4422 (0.13) | −0.5778 (0.74) |
| Mean of share of adult females | | −0.6501 (1.40) | −0.6314 (1.37) | −0.3620 (0.67) | −0.6449 (0.44) | 0.0181 (0.09) | 10.8421 (0.73) | 1.7289 (0.72) |
| Mean of share of children 6 and under | | −0.2368 (0.51) | −0.7717 (1.68)* | −0.7069 (1.32) | 4.0921 (2.64)*** | 0.5325 (2.47)** | 20.9293 (1.55) | 8.2952 (2.72)*** |
| Mean of share of youth aged 7 to 20 | | −0.3623 (0.97) | −0.5116 (1.38) | −0.4451 (1.05) | 1.5490 (1.16) | 0.1209 (0.64) | 0.8803 (0.08) | 2.9251 (1.27) |
| Mean of share of elderly | | −0.8554 (1.77)* | −0.8608 (1.69)* | −0.9845 (1.41) | −0.0155 (0.01) | −0.0376 (0.14) | 6.0459 (0.37) | 3.7361 (1.02) |
| Mean age of household head | | 0.0011 (0.06) | −0.0029 (0.14) | 0.0119 (0.48) | −0.0751 (1.11) | 0.0021 (0.24) | −0.1127 (0.18) | 0.2157 (1.49) |
| Mean age of household head, squared | | 0.0000 (0.20) | 0.0001 (0.49) | −0.0000 (0.08) | 0.0006 (0.91) | −0.0000 (0.47) | 0.0021 (0.31) | −0.0021 (1.39) |
| % of female headed households | | 0.0620 (0.41) | −0.0634 (0.41) | −0.0878 (0.49) | −0.3470 (0.63) | 0.0868 (1.25) | −3.9833 (0.74) | 3.2003 (3.27)*** |
| Ward variables | | | | | | | | |
| Ward mean distance to market (log) | | −0.1187 (6.18)*** | −0.1289 (6.36)*** | −0.1345 (5.24)*** | 0.0424 (0.62) | 0.0095 (1.02) | | −0.0387 (0.32) |
| Median rice price in ward (log) | | 0.1377 (2.30)** | 0.1822 (2.81)*** | 0.2334 (3.05)*** | −0.5358 (3.07)*** | −0.0483 (2.06)** | −5.5136 (3.68)*** | 0.5044 (1.50) |
| Median wage rate in ward (log) | | 0.1845 (6.40)*** | 0.2009 (6.74)*** | 0.2053 (5.53)*** | −0.0616 (0.80) | −0.0128 (1.08) | −4.9492 (5.40)*** | −0.0267 (0.13) |
| Gini coef. of per capita consumption | | 0.0674 (0.35) | 0.2376 (1.05) | −0.1546 (0.73) | −1.6990 (2.56)** | −0.2035 (1.88)* | −3.8402 (0.63) | −1.2383 (1.12) |
| Urban population within 2 hrs travel time | | −0.3833 (4.39)*** | −0.3518 (3.85)*** | −0.3513 (3.41)*** | 0.2444 (0.76) | −0.0321 (0.62) | −9.9822 (3.15)*** | 0.1305 (0.17) |
| Population Density (per sqkm) | | 0.0001 (2.79)*** | 0.0001 (2.66)*** | 0.0001 (2.56)** | −0.0005 (2.72)*** | 0.0000 (0.39) | 0.0002 (0.12) | 0.0002 (0.38) |
| Household variables | | | | | | | | |
| Household size (log) | | 0.6213 (26.90)*** | −0.0101 (1.26) | −0.0129 (1.51) | 4.1783 (27.19)*** | 0.6277 (27.25)*** | 0.4690 (2.27)** | −0.4544 (1.94)* |
| Share of adult females | | −0.0083 (0.10) | 0.0021 (0.12) | −0.0006 (0.02) | −0.3647 (0.70) | −0.0079 (0.09) | −0.5527 (1.09) | 3.6095 (4.40)*** |
| Share of children 6 and under | | −0.6221 (6.93)*** | 0.0156 (0.61) | 0.0161 (0.55) | −4.7489 (8.41)*** | −0.6141 (7.03)*** | −1.3136 (2.08)** | 3.4584 (4.19)*** |
| Share of youths aged 7 to 20 | | −0.3141 (4.44)*** | −0.0011 (0.05) | −0.0042 (0.19) | −2.3547 (5.31)*** | −0.2829 (4.08)*** | −0.8727 (1.70)* | 2.2643 (3.40)*** |
| Share of elderly 65 and above | | −0.0185 (0.16) | −0.0122 (0.43) | −0.0410 (1.30) | 0.1202 (0.18) | 0.0003 (0.00) | −0.3303 (0.49) | 2.0548 (2.47)** |
| Age of household head | | 0.0021 (0.60) | −0.0003 (0.42) | −0.0000 (0.05) | 0.0294 (1.11) | 0.0024 (0.66) | −0.0179 (1.14) | −0.0223 (0.74) |
| Age of household head squared | | −0.0000 (0.52) | 0.0000 (0.07) | −0.0000 (0.14) | −0.0003 (0.95) | −0.0000 (0.52) | 0.0001 (0.98) | 0.0004 (1.29) |
| Female head dummy | | −0.0100 (0.37) | −0.0052 (0.91) | −0.0066 (0.97) | 0.0486 (0.27) | −0.0076 (0.29) | 0.2499 (1.60) | 2.1226 (6.48)*** |
| Value of assets (log) | | 0.0924 (11.79)*** | 0.0192 (5.56)*** | 0.0211 (5.81)*** | 0.4557 (10.62)*** | 0.0742 (10.91)*** | −0.2790 (2.49)** | 0.0546 (1.48) |
| Regional dummies | | included but not shown | | | | | | |
| Constant | | 7.2386 (12.88)*** | 8.0190 (13.84)*** | 7.4107 (9.45)*** | 5.6509 (3.09)*** | −0.7117 (2.71)*** | 30.3481 (1.56) | −7.6982 (1.86)* |
| Number of observations | | 2894 | 3069 | 3069 | 2894 | 2894 | 3069 | 3069 |
| R-squared | | 0.60 | 0.73 | 0.70 | 0.42 | 0.45 | 0.68 | 0.12 |
| Joint test of the instruments | | | | | | | | |
| F-test of joint significance of the instruments | | 6.79 | 6.41 | 4.96 | 19.54 | 25.29 | 2.56 | 2.96 |
| p-value | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

Robust t statistics in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.

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