Subjective Welfare, Isolation, and Relative Consumption*

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Abstract

The recent literature has shown that subjective welfare depends on relative income. Attempts to test this relationship in poor countries have yielded conflicting results, suggesting that the relationship is not universal or only applies above a certain income level. We revisit the issue using data from Nepal. We find a relative consumption effect that is robust, strong in magnitude, and consistent across consumption expenditure categories. We find no evidence that poor households – in a relative or absolute sense – care less about relative consumption than more fortunate ones. Households residing far from markets care more – not less – about the consumption level of their neighbors, suggesting that market interaction is not what makes people care about relative consumption. 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.

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1. Introduction

In recent years economists have come to realize that people care not only about their standard of living but also about how they fare relative to others. There is a growing empirical literature showing that relative income affects well-being (e.g. Easterlin 1974, Easterlin 1995, Easterlin 2001, Blanchflower & Oswald 2004, Luttmer 2005). Various interpretations have been proposed for these findings, such as envy, aversion to inequality, or a human propensity to judge one's achievement relative to that of others (e.g. Frey & Stutzer 2002, Layard 2002, Diener, Suh, Lucas & Smith 1999).

A couple recent articles have presented evidence suggesting that this relationship may not hold in poor countries. In South Africa Kingdon & Knight (2004) have shown that subjective well-being falls with average income in the district – as found in other studies – but also that it rises with average income in the immediate neighborhood. They interpret this result as indicative of either of altruism or of local public goods, such as risk sharing among neighbors. Using data from Malawi, Ravallion & Lokshin (2005) show that subjective welfare falls with average neighborhood income, but only upper income households.[1] From this they conclude that the poor care solely about absolute deprivation – and hence that absolute poverty as a welfare measure is a justified policy yardstick.[2]

These articles cast some doubt on the idea that relative income matters in poor countries the same way as it does in developed economies. In this paper we revisit the issue using a detailed household survey from Nepal, the 1995/96 Nepal Living Standards Survey (NLSS). Nepal offers

[1] Keeping in mind that the rich in the Malawian household sample are quite poor by world standards.

[2] We agree with Ravallion and Lokshin that absolute – not relative – poverty should form the basis for welfare policy. 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 & Gregoire 2002, Foster 1998). Having said this, as economists, we should not ignore a reality that could potentially account for some patterns of human behavior. We revisit this point in the conclusion.

a suitable comparison point to Malawi, having only a slightly higher GDP per capita.[3]

Using answers to consumption adequacy questions as measure of subjective welfare, we find that satisfaction increases with own consumption but falls with the average consumption of neighbors. 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. We find no evidence that the poor – in a relative or absolute sense – care less about relative consumption than the rich.

We show that the relative income effect depends on market interaction. One view of traditional societies holds that market interaction destroys the sense of community and fuels competition and rivalry (Scott 1976). If this is true, households with little market interaction should care less about relative incomes. Nepal offers an excellent opportunity to test this idea because the mountainous nature of the country isolates many villages from markets.

Results show the opposite: respondents residing far from markets care more – not less – about the consumption level of their neighbors; and households with a migrant member working elsewhere are less sensitive to average consumption in their village. We also find that household heads who have migrated out of their birth district still judge the adequacy of their consumption partly in relation with that of households in their district of origin. These findings are consistent with the reference point hypothesis, which states that people judge their achievements relative to those of others like them (e.g. Layard 2002, Diener, Diener & Diener 1995, Kahneman, Diener & Schwarz 1999). 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

[3] 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 is much richer by comparison, with a GDP per head roughly ten times that of Malawi.

and relatively isolated from market forces.

Our work fits in a growing behavioral economics literature on subjective welfare which is nicely summarized by Frey & Stutzer (2002). Subjective well-being and consumption adequacy questions were initially developed by psychologists studying happiness.[4] They showed that answers to subjective questions are correlated with objective indicators of welfare, such as suicide rates and clinical depression (e.g. Frey & Stutzer 2002, Kahneman, Diener & Schwarz 1999). Answers to subjective well-being and consumption adequacy questions are also correlated with income and poverty (Diener & Oishi 2000). A strong empirical association has indeed been found between income and answers to the subjective well-being question (e.g. Easterlin 1974, Easterlin 1995, Easterlin 2001, Blanchflower & Oswald 2004, Di Tella, MacCullock & Oswald 2001, Frey & Stutzer 2002, Diener et al. 1999). Recent evidence of this relationship is provided by Kingdon & Knight (2003) for China and by Lokshin, Umapathi & Paternostro (2003) for Madagascar. Fafchamps & Shilpi (2005) provide similar evidence for the consumption adequacy questions in Nepal. Furthermore, using data on Nepal and Jamaica, Pradhan & Ravallion (2000) demonstrate that responses to the questions on subjective consumption adequacy are strongly correlated with more objectively measured poverty indicators – and can even be used to construct an approximate poverty index.

The sensitivity of answers to these subjective questions with respect to relative income and consumption has been documented not only by psychologists but also by economists. Using data on US states, Blanchflower & Oswald (2004) for instance show that subjective well-being increases with own income but falls with average income in the state. Luttmer (2005) uses average income at the county-level and finds similar evidence. Luttmer argues that his results

[4] In this literature the phrase 'subjective well-being' refers to answers to the question 'How happy, satisfied, or pleased have you been with your personal life during the past month?'. In this paper we use answers to consumption adequacy questions that are detailed in the data section.

are most likely caused by interpersonal preferences, not just by changes in the way people define happiness.

It is widely recognized that there are some problems with subjective questions. In particular, the relationship between subjective well-being and income appears to break down over time. For instance, over the last 50 years the US has experienced no change in subjective well-being despite a 6-fold increase in income per head (e.g. Easterlin 1974, Frey & Stutzer 2002). Inter-country comparisons have further shown that diffentials in subjective well-being across countries are not commensurate to differentials in GDP per head, especially at higher levels of income (Inglehart & Klingemann 2000). The breakdown of the relationship between subjective well-being and income over time and across nations is usually blamed on what Brickman & Campbell (1971) call the 'hedonic treadmill': respondents adjust their reference point to changes in the general prosperity level of the nation. But within nations at any one point in time, the relationship between objective and subjective well-being and consumption adequacy is much stronger. Since we only have cross-section data from a single country, this should not affect our analysis.

Veblen (1899), in his theory of the leisure class, introduced the concept of conspicuous consumption and suggested that people may overconsume prestige goods to assert their social status. In a similar vein, Duesenberry (1949) made 'keeping up with the Jones' an important part of his theory of consumer behavior. In both cases, relative consumption is hypothesized to affect behavior. While our results suggest that people have *preferences* with respect to relative consumption – in the sense that they derive satisfaction from doing better than their peers – we do not test whether people *behave* in a rival manner. This is left for further research.

The paper is organized as follows. In Section 2 we briefly discuss our testing strategy. The data are introduced in Section 3. The empirical analysis is presented in Section 4.

2. Testing strategy

The starting point of our investigation is the observation often made by psychologists that people care about relative income – or consumption. 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. That people care about how their income or consumption level compares to that of others is now a firmly established stylized fact in the psychology literature (e.g. Diener et al. 1999, Frey & Stutzer 2002).

Much of this literature, however, is based on evidence originating from developed countries. But how general is it? In particular, it is unclear whether the same relationship applies to poor countries. Below a certain level of consumption, people may only care about their own consumption. It is also conceivable that relative consumption only affects subjective well-being in developed economies. This could arise for instance because the market interactions associated with economic development fuel competition and create a culture of rivalry and inter-personal comparisons. Our goal is to test these hypotheses.

2.1. Satisfaction and 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 $x_k = \log \overline{X}_k$ where X_{ik} is i's 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 (2.1) using answers to subjective consumption adequacy questions as proxy for utility, and to test whether β is significantly different from 0.[5]

This is similar to the approach adopted by Blanchflower & Oswald (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 κ is interpreted as an absolute income effect and θ as a relative income effect. Calculating $\overline{X}_k$ at the level of US states, they find that the coefficient of relative income θ is approximately equal to 40% of the coefficient of absolute income κ. Formulation (2.2) is formally equivalent to (2.1) with $\beta = -\theta$ and $\alpha = \kappa + \theta$. We also test whether individuals care *only* about relative consumption. We do this in several ways. First we test whether $\alpha = \beta$ in regression (2.1). This is equivalent to testing whether $\kappa = 0$ in equation (2.2).

We wish to investigate whether the rich are more sensitive to relative consumption. We do this in two ways. First we follow Ravallion & 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

[5] 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. If individuals are mobile, a high value of x_k incites people to move away from k unless they are compensated by a higher wage. It is beyond the scope of this paper to discuss the kind of equilibria that may arise from endogenous sorting of individuals in the presence of rivalry. It is also unclear whether people fully anticipate the effect of rivalry when deciding where to relocate.

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 rich 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 θ 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 $\phi(.)$.

2.2. Relative consumption and markets

The effect of relative consumption on subjective satisfaction has been documented in developed countries. What is unclear is whether such preferences are innate, in the sense that they arise in any human society no matter how isolated, or whether they are the result of interaction with the market. Nepal offers an excellent opportunity to test this hypothesis because it has remained relatively isolated until fairly recently. The first road into the capital city Katmandu was built in 1929, and many areas of this mountainous country have no road and remain very hard to reach.

To investigate this idea, let d_k represent interaction with the market. We estimate a regres-

sion model of the form:

$$V_{ik} = \alpha x_{ik} - \beta_0 x_k + \beta_1 d_k x_k + \gamma z_{ik} \tag{2.7}$$

If $\beta_1 < 0$ this means that sensitivity towards relative consumption increases with market interaction. 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. The details of the estimation are discussed in the empirical section.

2.3. Multiple satisfaction indices

So far we have discussed utility as single index. Suppose now that we have subjective satisfaction indicators for several consumption subsets c_h such as food or clothing. To integrate these indicators into our analysis, suppose that total consumption can be decomposed into H subsets and, 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 ω_h are consumption shares with $\sum \omega_h = 1$. Let:

$$U^h = \log c_h - \lambda_h \log \overline{c}_h \tag{2.8}$$

where $\overline{c}_h$ is average consumption of h in the ward and λ_h is a relative consumption coefficient that may vary across goods. If $\lambda_h = 1$, utility depends only on relative consumption. Since $\overline{c}_h$ is

regarded as exogenous by individual consumers, utility maximization yields the usual $c_h = \frac{\omega_h X}{p_h}$.[6] Averaging over households in the ward to replace $\overline{c}_h$ we get:

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

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 λ_h can thus be approximated as:

$$\lambda_h \approx \frac{\beta_h}{\alpha_h} \tag{2.9}$$

Comparing λ_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:

$$\begin{aligned} U &= \sum_{h=1}^{H} \omega_h (a_h + \log X - \lambda_h \log \overline{X}) \\ &= a + \log X - \lambda \log \overline{X} \end{aligned} \tag{2.10}$$

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

$$\lambda = \sum_{h=1}^{H} \omega_h \lambda_h \tag{2.11}$$

[6] Expanding equation (2.8) 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.

The value of λ for total utility is a weighted sum of partial rivalry coefficients, weighted by consumption shares. We use equations (2.10) and (2.11) 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.[7] Nowhere do the questions refer to other villagers or imply a comparison with others: adequacy is defined relative to the respondent's needs.[8] 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.[9]

[7] 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, [] 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].

[8] 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'.

[9] 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

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 percent of respondents state that their income is less than adequate for their family needs. Food consumption received the best rating, with 47 percent of respondents judging it 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 hour. But some households are located as much as 30 hours 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

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 NLSS.

effects. Using information compiled by Fafchamps & 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 hours of travel distance from the ward. Population figures come from the 1991 census. Following Fafchamps & 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

4.1. Testing relative consumption

We begin by estimating equation (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[10] 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.[11]

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

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

[11] 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.

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 λ_h is highest for housing and health care and lowest for food and clothing. Except for housing where λ_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 (2.11) we find a weighted average value of $\lambda = 0.97$, very close to 1. This is larger than λ_h in the total income adequacy regression, which is 0.77.[12] The difference, however, is not significant at 10% level (p-value=.24).

In their study of subjective well-being the US, Blanchflower & Oswald (2004) find a λ estimate of about 40%. Our estimate is much larger.[13] 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 Oswalt, $\overline{X}_k$ 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 & Oswald (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 remain the possibility that the results presented in Table 3 overestimate λ. 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

[12] 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.

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

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 λ_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 capture the idea that the value of farming experience – which is partly inherited from parents (Rosenzweig & Wolpin 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 λ_h; all other results are basically the same whether we instrument or not.

Equation (2.1) is reestimated with instrumented x_{ik} than for x_k.[14] 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

[14] 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 & Blundell (1986) and Anderson & Hsiao (1982) and include the residuals from the instrumenting regression as additional regressors.

equivalent units with which to divide consumption (e.g. Deaton & Paxson 1998, Gan & 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 hours 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 λ_h falls in all cases except for food. Except for health care, parameter λ_h is now less than 1 in all cases – significantly so for clothing and schooling.[15] Using formula (2.11) we obtain an average $\lambda = 0.83$, not significantly different from the λ_h for total income, which is 0.73.

Several control variables have the anticipated effect. As shown by Fafchamps & 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.[16]

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

[15] As is clear from the discussion in Section 2, estimation of λ_h from regression results rests on the assumption that consumption decisions are choice variables. In the presence of quantity rationing, approximation (2.9) overestimates λ_h, a point made in a related context by Fafchamps & Shilpi (2005). Given that health provision is partly subsidized, quantity rationing is likely.

[16] 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.

wards but at the same time generate a lot of local resentment.[17] 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 rich, as argued by Ravallion & Lokshin (2005). We begin by estimating model (2.4) with an interaction term $x_{ik}x_k$. We report in Table 6 uninstrumented results without additional controls – i.e., the

[17] 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.

same regression as in Table 3 except for the added interaction term. Contrary to expectations, we find that, if anything, those with are rich 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 (2.5) to test whether the rich 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 θ_l and θ_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 equation (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 Figure 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 rich care more or less equally about their relative position when assessing the adequacy of their consumption level.

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 & Klingemann 2000) and provides strong incentives (Fehr & Falk 2002). In contrast,

as argued by Ravallion & Lokshin (2005) and others (e.g. Ravallion & Dearden 1988, Cox 1987), village life is characterized by risk sharing practices that foster a sense 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 & 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 (2.7):

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

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 $\partial V_{ik}/\partial x_k = -\widehat{\beta}_0 + \widehat{\beta}_1 d_k$ in Figure 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; $\widehat{\beta}$ 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.

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?

One alternative interpretation of our findings is not that market interaction reduces sensitivity to relative consumption, but rather that it changes the composition of the comparison group. We do not observe households' reference group, so we cannot investigate this possibility directly. But we can look for evidence of reference group effects in our data, and for signs of a change in reference group after people interact with the market. Some 20% of surveyed household heads live in a district other than their birth district. These migrants may, at least for a while, judge their economic success relative to other 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.[18] 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 β_0 remains negative and significant as before, while β_2 is negative in all regressions and significant at the 10% level or better in five out of six. This suggests that people 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 suggest the existence 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.

Unlike in Kingdon & Knight (2004), adding x_d^r does not reverse the sign of β_0. Furthermore coefficient β_1 is only significant in one regression – food – with a positive sign. Contrary to the work of Knight and Kingdon, we find no evidence that surveyed villagers feel altruism towards

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

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 & Oswald 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 results, suggesting either that the consumption level of immediate neighbors has a positive effect on subjective welfare (Kingdon & Knight 2004), or that only the rich care about their neighbors' consumption (Ravallion & 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 & Oswald (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 interactions. 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.

This paper confirms that relative assessment affects subjective welfare even among very poor households that are isolated from the market. It remains to be shown that relative assessment influences 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.[19]

Concerns for relative consumption may also affect voluntary contributions to public goods. For instance, in their book on the management of communal resources Baland & 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 & Platteau 1998, Baland & Platteau 1997, Baland & Platteau 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

[19] 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.

instance, criticizes landlords and their lack of concern for tenants as a reason for the breakdown of – otherwise idealized (see Popkin (1979)) – mutual insurance systems in South-East Asia. More ominous evidence can be found in Andre & 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 in part from relative income considerations (e.g. Besley & Burgess 2002, Strom 1995). This point is related to the issue of fairness in games (e.g. Rabin 1993, Kahneman, Knetsch & Thaler 1986, Fehr & Schmidt 1999). These issues deserve more research.

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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		

Table 2. Household and ward characteristics

Household characteristics	**Unit**	**Mean**	**Median**	**St.dev.**	**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
% hholds 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 sqkm	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				

Table 3. Relative consumption and subjective consumption adequacy

	Subjective adequacy of:					
	Food	**Clothing**	**Housing**	**Schooling**	**Health care**	**Income**
Consumption expenditures (log)	0.725	0.628	0.450	0.481	0.337	0.474
	(14.35)***	(12.49)***	(9.36)***	(8.49)***	(6.56)***	(9.20)***
Ward mean consumption (log)	-0.619	-0.502	-0.681	-0.581	-0.479	-0.363
	(4.17)***	(3.63)***	(4.89)***	(3.81)***	(3.01)***	(2.81)***
Ward mean distance to market (log)	-0.409	-0.403	-0.369	-0.434	-0.567	-0.258
	(7.68)***	(7.92)***	(6.92)***	(7.91)***	(8.95)***	(5.32)***
Regional dummies	included but not shown					
Intercept	-0.999	-1.297	2.280	0.942	1.290	-1.694
	(0.69)	(0.95)	(1.61)	(0.63)	(0.80)	(1.39)
Number of observations	3089	3087	3086	2486	3069	3080
λ	0.85	0.80	1.51	1.21	1.42	0.77
Testing whether α=β (or λ=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%

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

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	2.3278	1.5144	1.8978	1.0880	1.1660
	(4.74)***	(6.59)***	(4.64)***	(5.00)***	(3.22)***	(3.43)***
Ward mean consumption (log) (*)	-1.5900	-1.2680	-1.0506	-1.1993	-1.2273	-0.8569
	(4.75)***	(4.50)***	(3.50)***	(3.43)***	(3.87)***	(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	2.3803	1.5835	1.9775	1.2786	1.2184
	(4.59)***	(6.45)***	(4.62)***	(4.98)***	(3.63)***	(3.47)***
Ward median consumption (log) (*)	-1.5911	-1.3156	-1.1218	-1.3011	-1.4753	-0.9145
	(4.45)***	(4.39)***	(3.44)***	(3.44)***	(4.38)***	(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	0.9760	0.4081	0.6082	-0.2573	0.2578
	(0.35)	(2.61)***	(1.06)	(1.46)	(0.64)	(0.71)
Ward rank in consumption (*)	0.2529	0.2089	0.1731	0.2010	0.2219	0.1467
	(4.84)***	(4.55)***	(3.49)***	(3.63)***	(4.31)***	(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	-3.907	-0.675	-3.127	-4.371	-1.248
	(0.82)	(3.24)***	(0.56)	(2.53)**	(3.28)***	(1.09)
Ward mean consumption (log)	-2.292	-4.977	-1.792	-4.155	-5.121	-2.066
	(1.94)*	(4.13)***	(1.50)	(3.30)***	(3.90)***	(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	-0.379	-0.362	-0.418	-0.545	-0.248
	(7.38)***	(7.46)***	(6.69)***	(7.69)***	(8.68)***	(5.04)***
Regional and belt dummies	included but not shown					
Intercept	16.642	45.861	14.010	38.739	50.191	16.309
	(1.35)	(3.64)***	(1.12)	(2.94)***	(3.63)***	(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 θu=θl						
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

Table 8. Relative consumption and market isolation

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

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

Table A1. Instrumenting regressions

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

Figure 1.Relative Poverty and Subjective Satisfaction

95% confidence interval shown

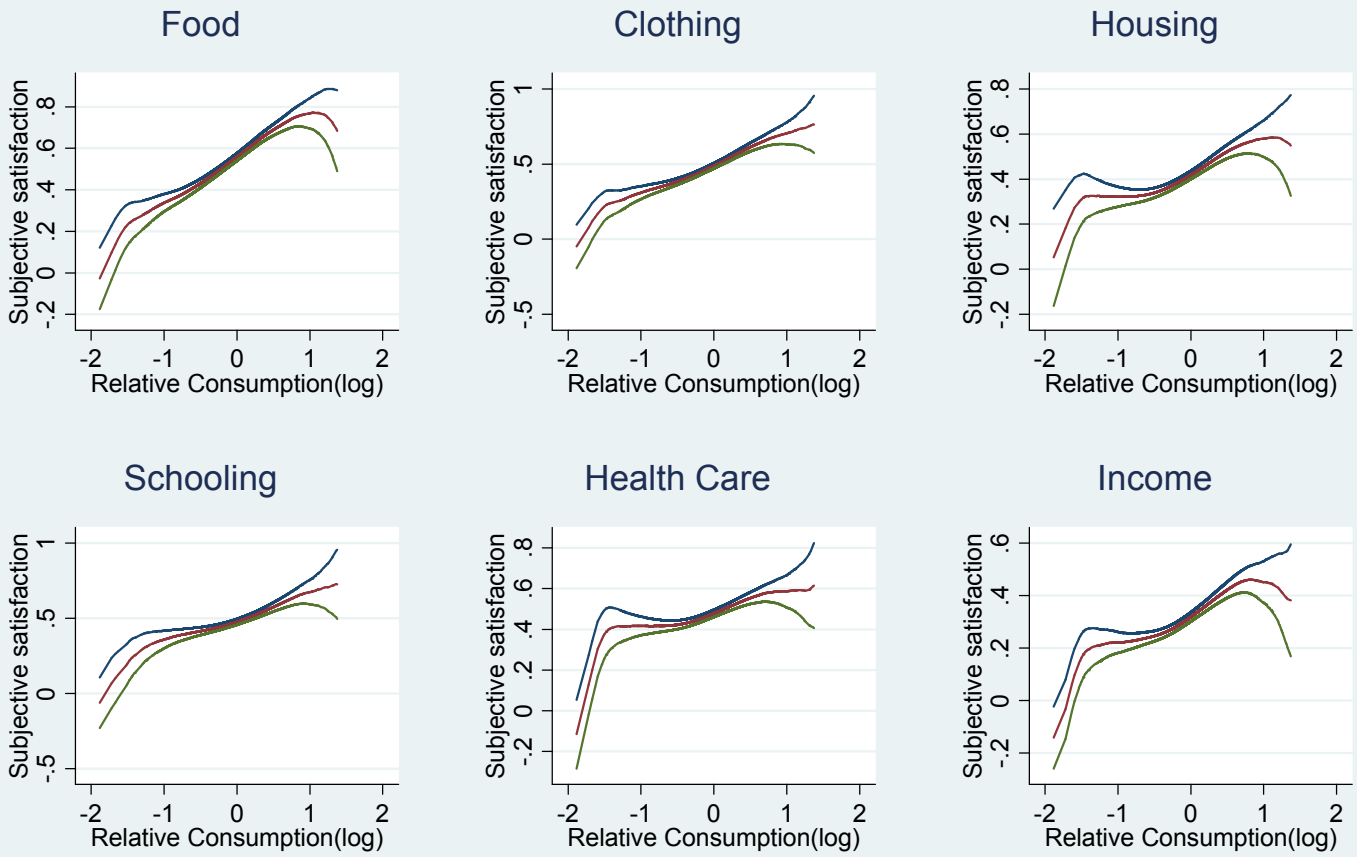

Figure 2. Relative Consumption and Market Isolation