Subjective wellbeing and income: Empirical patterns in the rural developing world

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Abstract

A commonality in the economics of happiness literature is that absolute income matters more for the subjective wellbeing of people at low income levels. In this article, we use a large sample of people in rural areas of developing countries with relatively low income levels to test whether subjective wellbeing an increasing function of absolute income in our sample, and to analyze the existence of adaptation and social comparison effects on subjective wellbeing. Our sample includes 6973 rural households in 23 countries throughout Asia, Africa, and Latin America. The average total income per adult equivalent in our sample was US$1555, whereas levels of subjective wellbeing resembled levels found in previous research using cross-country data. We find that, despite low levels of absolute income, levels of subjective wellbeing of our respondents resemble levels found in previous research using cross-country data. We also find remarkable similarities in many of the determinants of subjective wellbeing previously tested. Our data show that absolute income covariates with subjective wellbeing, but -as for richer samples- the magnitude of the association is lower once we control for adaptation and social comparison. Finally, our results suggest that social comparison has a stronger effect than adaptation in explaining the subjective wellbeing of our sample. Our findings highlight the importance of adaptation and social comparison even at low levels of absolute income.

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Introduction

Findings from more than four decades of research have identified multiple correlates of happiness or subjective wellbeing, defined as 'a person's cognitive and affective evaluations of his or her life' (Diener, Oshi, & Lucas, 2002, p. 63)1. Researchers agree that both personal characteristics (age, family experience, income, or health) and external factors (work satisfaction, governance, values or religion) are related to subjective wellbeing (Helliwell et al. 2012; Easterlin 2003; Myers and Diener 1995; Myers 1993; Easterlin et al. 2010), but they continue to debate the causal links (Lyubomirsky et al. 2005; Clark et al. 2008). A key topic in this literature is the relation between income and happiness: to what extent can money buy happiness?

Research addressing the relation between subjective wellbeing and happiness has flourished especially after Richard A. Easterlin stated in his seminal article (Easterlin 1974, 1995) that, while at any particular time richer individuals are likely happier than poorer ones, over time societies may not become happier as they become richer. This so-called Easterlin paradox has generated a growing body of literature with conflicting evidence. Easterlin and co-authors (2010) continue to accumulate data that corroborate Easterlin's original findings. Other researchers have proposed a modified version of Easterlin's hypothesis, suggesting that while income and wellbeing are linked among people at low income levels, there is a threshold –or satiation point- beyond which further income is unrelated to wellbeing (Diener and Seligman 2004; Clark et al. 2008; Di Tella and MacCulloch 2008). Other authors argue that there is no paradox and people and countries do get happier with increasing income. While acknowledging that the relation can be less acute at higher levels of income, they argue that there is no satiation point at which income does not matter more for happiness (Deaton 2008; Stevenson and Wolfers 2008).

Attempts to explain any association between income and happiness have also sparked much research. Following Duesenberry (1949), several authors have stressed income comparisons – to oneself in the past (adaptation) and to others in their relevant reference group (social comparisons) - to explain how income and subjective wellbeing might be related. In other words, some authors argue that there is a process of adaptation: people may adapt to new circumstances, including new income levels. A change in income level might affect happiness in the short turn, but with time people tend to go back to their previous happiness levels (Suh et al. 1996; Easterlin 2003; Diener et al. 2006; Lucas et al. 2003) and more so when experiencing income rises than income falls (Burchardt 2005). For example, Inglehart and Rabier (1986) find that happiness is positively correlated with income increases over the past twelve months, yet unrelated to current income. Similarly, Di Tella and colleagues

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[1]Subjective well-being is an umbrella term that includes the various types of evaluation of one's life (self-esteem, joy, fulfillment, etc.). We use the terms happiness, subjective wellbeing, and life satisfaction interchangeably in the text.

(2010) suggest that increasing income loses more than half of its happiness effect after four years, suggesting that income effects on happiness dissipate with time. A common explanation for adaptation effects is the so-called "hedonic treadmill": unknowingly, people display escalating material aspirations as their income rises, thus capping over time happiness increments with rising incomes (Easterlin 2003; van den Bergh 2011).

On the other hand, authors have also argued that there is a process of comparison: individuals want to "keep up with the Joneses," so they compare their material positions to that of relevant peers. Hence, an increase in individual income would only lastingly raise individual wellbeing if the former exceeds that of group income (Diener et al. 1993; Clark et al. 2008). This could help explain why people may not seem to get generally happier, or at least not linearly, as their societies get richer. Some findings indeed confirm that, controlling for own income, the income of the reference group is negatively correlated with respondents' life satisfaction (Ferrer-i-Carbonell 2005; Blanchflower and Oswald 2004). Furthermore, when societies growing richer also become more unequal, individuals falling behind may experience relative deprivation that unleashes negative emotions of envy, guilt, anger, or depression, hence decreasing their subjective wellbeing (Subramanian et al. 2005; Wilkinson 1997). Yet, counterexamples do exist where subjective wellbeing proves to rise with reference group incomes due to a marked sense of community and altruism (Knight et al. 2006).

A consensus in the economics of happiness literature is that absolute income grows with diminishing returns (less-than-proportional increases) for subjective wellbeing (Frey and Stutzer 2002; Stevenson and Wolfers 2008), which implies that absolute income should matter more for the subjective wellbeing of people at low income levels (Howell et al. 2006; Camfield et al. 2010; Diener and Biswas-Diener 2002; Easterlin 2003). Thus, it has been argued that rises in income help the poor to meet their basic material needs, but as societies grow richer, rising aspirations and relative income gaps are expected to become more important in determining subjective wellbeing than absolute income (Diener and Seligman 2004).

Appealing as it might be, this argument has not been fully confirmed by real world data. A burgeoning amount of work addressing the determinants of subjective wellbeing in developing countries has examined to what extend the subjective wellbeing of the poor is negatively affected by positional concerns. This literature provides divergent results. Thus, against the assumption that relative income should not matter for the poor, several studies show that holding a low relative economic position (measured through relative income and/or relative consumption) negatively affects the wellbeing of the poor (see for example Guillen-Royo 2011; Knight and Gunatilaka 2012; Fafchamps and Shipi 2008; Knight et al. 2009; Fafchamps and Kebede 2008; Carlsson et al. 2009). Contrarily, low relative levels of income and consumption do not appear to affect subjective wellbeing among low-income samples in rural Ethiopia (Akay and Martinsson 2011) and Venezuela (Kuegler 2009). Ravallion and Lokshin (2010) find that, in Malawi, subjective wellbeing falls with average neighborhood income, but only among upper income households. Furthermore, in South Africa subjective wellbeing is found to increase with district average income (Kingdon and Knight 2006).

These studies are important as they provide detailed information on the dynamics of relative income in several parts of the developing world. However, because each of the studies employs a different methodology and approach, it is difficult to generalize from them. Only two works compare data from two or more countries (Herrera et al. 2006; Graham and Pettinato 2002) again showing contrasting findings. Furthermore, none of the mentioned studies addressing the effects of income on happiness in developing countries provides a systematic analysis of the two mechanisms that seem to mediate this relation in non-rural societies: adaptation and social comparisons.

In this article, we aim to contribute to research on the determinants of subjective wellbeing in developing countries. After testing whether subjective wellbeing an increasing function of absolute income in our sample, we analyze the existence of adaptation and social comparison effects on subjective wellbeing. We test for absolute income, adaptation and social comparison with a single data set which includes a large sample of people in rural areas of developing countries with relatively low income levels. For social comparison we include both an objective and a subjective measure of household's relative position. Our sample includes societies with a myriad of mores, social norms, religious beliefs, and livelihoods likely affecting notions of the relative importance of income and subjective wellbeing (Selin and Davey 2012; Diener et al. 2003; Myers 1993), assuring that our findings should be relatively robust.

Material and methods

A network of 35 researchers collected individual, household, and village data under the common framework of the Poverty Environment Network (PEN), a project of the Center for International Forestry Research (http://www.cifor.cgiar.org/pen/). Data collection occurred during 2005-10 in 23 different countries. Each case study included fieldwork covering between 9 and 12 months. Income data were collected through four quarterly household surveys using a three month recall period. Researchers also conducted a terminal survey which they used to collect measures of subjective wellbeing, adaptation, and social comparison. A comprehensive guide to fieldwork and research methods based on the PEN experience is published in Angelsen, Larsen, Lund, Smith-Hall & Wunder (2011).

Sampling

The PEN sites cover the major sub-continental areas of Africa, Asia and Latin America. Within the selected regions, villages were chosen according to stratification criteria along key gradients including market distance, vegetation types, land-tenure regimes, and ethnicity. Villages in continuous geographical sub-areas were aggregated into 'sites', comprising 50-350 households randomly selected from village censuses. Within a household, we interviewed the first household head (male or female) available. The sample originally included 8,301 households in the ex-ante survey, which by attrition were reduced to 7,978 households in the ex-post survey (with the subjective wellbeing questions). For the multivariate analysis presented below, missing observations in the explanatory variables reduce our sample to 6973 households within 52 sites (294 villages) in 23 countries from Asia, Africa, and Latin America.

Dependent variable: Subjective Wellbeing

Despite the potential limitations of using a single measure (Ferrer-i-Carbonell & Frijters, 2004) and to increase comparability with other studies, we followed the standard approach used by psychologists and economists to measure subjective wellbeing as the *overall appreciation of one's life* (Diener et al. 1999; Easterlin et al. 2010). We used a survey question that has proved useful in similar cross-country comparisons. Specifically, we asked: "*All things considered together, how satisfied are you with your life over the past 12 months?*" Responses to this question were ranked on a five-point scale from 1 (very unsatisfied) to 5 (very satisfied). We framed the question on a 12-month-period to allow for comparison with the detailed socioeconomic information collected in our surveys.

Explanatory variables

Absolute income—Cash and subsistence household income data were collected quarterly and aggregated to obtain a measure of annual income.[2] Subsistence income includes the value of self-consumed agricultural and forest products. To make comparisons across households, we scaled total household income by the adult equivalent units (AEU)[3]. For cross-country comparisons, we used purchasing power parity (PPP) exchange rates. Thus, our absolute income figures express PPP adjusted US$ per AEU.

Adaptation—Our measure of adaptation refers to the individual's own income in the recent past and was constructed by asking respondents to compare their household's economic situation to five years back (Knight et al. 2006). Respondents could rank their household's economic situation as *"worse-off"* (=0)*, "the same"* (=1) or "*better-off*" (=2).

Social comparison—We used two different measures of social comparison. First, we measured the self-perceived household position in relation to other households in the village. We asked: "*Compared with other households in the village, how well-off is your household?*" Respondents chose whether they considered their household as "*worse-off,*" "*average*" or "*better-off.*" Second, we also use a more objective measure of social comparison: relative income. We calculated a household's relative income by centering absolute income at the site level.[4] Thus, the variable reflects the income position of the household relative to the average site income. We used the site, rather than the country, as a comparison group because, in assessing their relative standing, people are more likely to compare themselves locally (Ferrer-i-Carbonell 2005).

Control variables

We selected control variables based on the literature on the determinants of subjective wellbeing (Helliwell et al. 2012; Easterlin 2003; Myers and Diener 1995; Myers 1993;

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[2]We kept households who missed one of the four quarters. For households participating in three out of the four quarterly surveys, we calculated the income for the missing quarter as the average of the non-missing quarters adjusted by a trend factor we defined as the ratio of village average for missing quarters to village average for non-missing quarters.

[3]We follow the formula used in World Bank analyses, which is a variant of the OECD scales (Atkinson, Rainwater & Smeeding, 1995): children below 15 years and adults above 65 years get a weight of 0.5, while all other household members (15-65 years) get a weight of 1.

[4]We subtracted the mean income at the site level from the household income, and divided the result by the standard error, so that the relative income has a (0,1) distribution.

Easterlin et al. 2010). We included both personal characteristics and external factors. The former were 1) sex (*female*), 2) *age* and *age squared*, 3) *household size,* 4) marital status (differentiating between informants who were *married* –or in marriage-like arrangements- (=1) at the moment of interview and informants who were single, divorced, and widowed (=0)), and 5) *education* level. Our control variables for external factors were 6) *illness* (whether or not a household member died or was seriously ill during the past 12 months), 7) *work situation,* assessed by three dummy variables *i) recently unemployed* (capturing whether someone in the household became unemployed during the period of research), *ii) major loss* (capturing whether the household suffered any major loss of crops or livestock), and *iii) business* (capturing whether the household received any income from own business); 8) *Social capital and support* was measured with four standard questions: *i) help* ("*Can you get help from other people in the village if you are in need, for example, if you need extra money because someone in your family is sick?*" coded as 1=yes, and 0=no or sometimes, but not always; *ii) trust* ("*In general, do you trust people in the village?*" 1=yes; 0=no or I trust some people but not others; *iii) bonding social capital* proxied by asking about household participation in forest user groups; and *iv) bridging social capital* assessing whether the household head belonged to the largest ethnic group in the village; and 9) *income inequality* was measured by computing Gini indices of inequality in our measured income's distribution at each site, and entered as a percentage in regressions. Our estimations also include a set of dummies for site.

Data analysis

We conducted descriptive and bivariate analyses with the pooled sample and the continental subsamples. We tested the association between individual subjective wellbeing and a) absolute income, b) adaptation, and c) social comparison using multivariate analysis to control for personal characteristics and external factors that previous research suggests as affecting subjective wellbeing. Because subjective wellbeing is a discrete ordered categorical variable, we used an Ordered Logit model. For the empirical analysis, we use the following expression:

$$SWB_{ihv} = \alpha + \beta Y_{ihv} + \gamma A_{ihv} + \delta SC_{ihv} + \varepsilon P_{ihv} + \zeta E_{ihv} + \eta C_v + \theta_{ihv} \quad [1]$$

SWB captures self-reported wellbeing of a person, where *i* denotes the responding subject, *h* the household, *v* the site. Y_{ihv} captures income, expressed as absolute income. A_{ihv} captures adaptation and SC_{ihv} captures social comparisons (self-perceived household position and relative income). P_{ihv} is a vector of control variables for personal and household characteristics that, according to previous research, directly affect wellbeing (e.g., age, marital status). E_{hv} is a vector of control variables for external factors that may affect SWB (i.e., work situation, income inequality). C_v represents dummy variables for site, country, and continent. θ_{ihv} is a random error term with standard properties.

In our first estimation, we use the baseline empirical specification typically used for studying the determinants of subjective wellbeing. This specification includes the measure of absolute income and previously identified personal, household, and village correlates of

happiness. In subsequent estimations we add the variables that capture adaptation and social comparison, while maintaining the rest of the terms in the equation. The approach allows us not only to assess the effects of adaptation and social comparison on subjective wellbeing, but also to observe the effects of absolute income on subjective wellbeing after the effects of adaptation and social comparison have been netted out. If absolute income matters more for the subjective wellbeing of people at low income levels than for richer samples (Howell et al. 2006; Camfield et al. 2010; Diener and Biswas-Diener 2002; Easterlin 2003), then we should find a very strong association between absolute income and subjective wellbeing in our sample. Furthermore, this association would not be significantly altered by the inclusion of adaptation and social comparison measures, variables that would also have a weak association to subjective wellbeing.

We tested for multicollinearity between our explanatory and control variables by calculating the variance inflation factor (VIF). We only found evidence of multicollinearity between age and age square and the village dummies, but in both cases collinearity is a property of the predictors, not of the model. The VIF of the rest of the variables included in our model is <1.7, and the mean VIF for the variables included in the different models is <1.2. We ran our models for the full sample, and for the three regional sub-samples.

Results

Descriptive and bivariate analyses

The average subjective wellbeing was slightly above the midpoint (3) of our measure of subjective wellbeing (mean=3.2; SD=1.03). On a range from 1 to 5, 49.0% of the informants reported a subjective wellbeing of 4 or 5. Six per cent of the informants reported to be very unsatisfied with their lives, while 5.0% reported to be very satisfied. The analysis by regions suggests some noteworthy patterns: while 86.1% of Latin American and 61.4% of Asian respondents were above the midpoint (>3), the share was lower in Africa (43.3%), where 8% reported to be very unsatisfied with their lives.

The average total PPP income per AEU was US$1555 (Table 1, Row [A]). Cash income accounted for US$1044 and subsistence income for US$ 516. Only 0.23% of households did not receive cash from any source. Important differences across regions included that average absolute income in the Latin American cases was double and triple that in Asia and Africa, respectively. Differences were statistically significant in a Kruskal-Wallis test (p<0.001).

40.1% of respondents thought their household was better-off at the time of the interview than five years prior, 34.9% thought it was about the same, and 25.0% thought they were worse-off (Table 1, Row [B]). The share of households perceiving that their situation had improved was larger in Latin America (60.8%) than in Asia (40.7%) and Africa (35.0%). The average absolute income of people who considered that the economic situation of their household was worse than five years ago was about half the absolute income of people who considered their economic situation to be better than five years ago.

About one third of the sample was above the mean absolute income (Table 1, Row [D]). The share of households in the better-off category is lower when looking at the perceived

household's position in a village (Table 1, Row [C]) than when looking at relative income (Table 1, Row [D]). Thus, only 18% of the respondents considered that their households were better-off than other households in the same village (versus 34% who were actually above the mean in terms of absolute income). Most people (63%) reported their household as being in the category "average" income.

A common occurrence in all the comparisons is that the average absolute income was higher for the self-reported better-off groups than for the middle and worse-off groups. In both the global and the regional analyses, the difference in absolute income between the better-off and the other groups was statistically significant in a one-way ANOVA test (p<0.001). This indicates some correspondence between absolute income and our measures of adaptation and social comparison.

The descriptive statistics of other variables used in multivariate regression analysis can be found in Table 2. The average respondent in our sample was a married (88%) man (75%) of around 44 years of age belonging to the largest ethnic group in his village of residency (77%) with a relatively low level of education (only 2% had higher education) and living in a household with the equivalent of 4 adults. About one third of the households (31%) had suffered a death or a major illness within the year prior to the interview. Only 37% of respondents were certain they could obtain help if needed, and about half of the sample (47%) generally trusted people in the village. 27% of the households in the sample participated in forest users groups. The average Gini index of site income inequality was of 0.38, the lowest being in Asia (0.33).

Multivariate analysis

We start by analyzing the correlates of subjective wellbeing without the income comparison variables (Table 3, Model [a]). Our basic analysis shows that absolute income, household size, being married, owning a business, the ability to get help, and trust seem to have a positive effect on subjective wellbeing, while the presence of illness in the household, major economic losses, and income inequality seem to have a negative effect on subjective wellbeing. Our data do not show a relation between subjective wellbeing and the sex of the respondents, their age, or their level of education. We did not find a relation between being recently unemployed or between bonding and bridging social capital and subjective wellbeing either.

We also found a positive and statistically significant association between absolute income and subjective wellbeing. Since income is measured in log terms, the coefficient should be read as elasticity. If a subject was to increase her absolute income by one percent, the ordered log-odds of having a higher subjective wellbeing score would increase by 0.44 while the other variables in the model are held constant.

In our next model, we introduce our measure of adaptation (Table 3, model [b]). We find a clear association between the perceived situation relative to past income and subjective wellbeing. For subjects who perceived that their income was worse than 5 years ago, the odd-logs of reporting higher subjective wellbeing was 0.82 less than for people who did not perceive any change in their income, and it was 0.57 more for people who perceived that

their income was higher than in the past (p<0.05). In this model, the relation between absolute income and subjective wellbeing remains positive and statistically significant, although the magnitude of the coefficient decreases (as compared to Model [a]).

Social comparisons were analyzed via the alternative inclusion of two proxy variables (Models [c] and [d]). The two variables that capture social comparisons bear a statistically significant association with subjective wellbeing. For subjects who perceived that their income was worse than the income of neighboring households, the odd-logs of reporting higher subjective wellbeing was 1.2 less than for people who consider their income to be around the local average. Contrarily, for subjects who perceived that their income was better than the income of neighboring households, the odd-logs of reporting higher subjective wellbeing was 0.85 more (p<0.05). Similarly, improving the income position of the household relative to the average site income also increased the log-odds of a person reporting higher subjective wellbeing (Model [d]).

As in the model including adaptation, in the two models that consider social comparison, absolute income continues to bear a positive and statistically significant association with subjective wellbeing. However, the magnitude of the coefficient drops from 0.436 in the benchmark model to 0.28 when including self-perceived household position and to 0.26 when including relative income.

Table 4 presents a regional analysis, which basically consisted of running the same equations as in Table 3, but using only our regional sub-samples. Table 4 reports only the coefficients of absolute income, adaptation, and social comparison variables, although the model calculated includes the same controls as in Table 3. We highlight two common trends and three regional differences. The first commonality is that in most regressions, adaptation and social comparison variables seem to be associated to subjective wellbeing in the expected direction. The second is that in all regressions, the inclusion of adaptation and social comparison variables reduces the coefficient of the association between absolute income and subjective wellbeing. The main regional differences consists of the lack of statistically significant association between relative income and subjective wellbeing for the African sample; the lack of statistically significant association between absolute income and subjective wellbeing for the Asian - sample once relative income is included in the equation; and the overall lack of statistically significant association between absolute income and subjective wellbeing for the Latin American sample.

Discussion

The overall agreement in the economics of happiness literature is that absolute income matters more for the subjective wellbeing of people at low rather than at high income levels. And this is so because rises in income help the poor meet their basic material needs (Howell et al. 2006; Camfield et al. 2010; Diener and Biswas-Diener 2002; Easterlin 2003). From this assumption it is derived that income comparisons should become more important in determining subjective wellbeing as societies get richer (Diener and Seligman 2004). Because the empirical work testing this assumption shows conflicting results, here we have

tried to assess the role of comparison income (through adaptation and social comparison) in the subjective wellbeing of people with low income levels.

Despite differences in sample composition (i.e., our sample does not include urban populations nor people in so-called developed countries), we find that overall levels of subjective wellbeing in our sample resemble levels found in other global samples. For example, aggregated data collected from 2005 through mid-2011 from respondents in 150 countries answering the Gallup World Polls show that, on a scale from 0-10, over two-thirds of the sample report levels of subjective wellbeing at the midpoint of the scale or higher (Helliwell et al. 2012), whereas only about 4% of that sample gives values in the two lower categories of the scale. This roughly resembles our data, where 49.0% of the informants reported a subjective wellbeing of 4 or 5 and only 6% of the respondents reported to be very unsatisfied with their lives. The similarity is noteworthy because the respondents to our survey had relatively low levels of absolute income. Notably, the average absolute income in our sample is about US$ 1500 (PPP conversion) per AEU, well below the US$ 8000 per capita threshold beyond which further income is believed to have diminishing returns to wellbeing (Layard 2005; Frey and Stutzer 2002).

Findings from our work also support the long claimed finding that there are multiple correlates of subjective wellbeing (Helliwell et al. 2012; Easterlin 2003; Myers and Diener 1995; Myers 1993; Easterlin et al. 2010), and this is so also for people at relative levels of low income. Thus, our results confirm the universally tested positive role of marriage, self-employment (i.e., owning a business), help, and trust on subjective wellbeing, and the -also largely tested- negative effects of the presence of illness in the household, major economic losses, and income inequality. Our findings also support the idea that there is not a clear, universal pattern of relation between the sex of the respondent, her level of education, and her subjective wellbeing (Helliwell et al. 2012). Perhaps the most contrasting finding with previous literature is that we fail to find the well established U-shaped relation between age and subjective wellbeing. Previous work has found that through life satisfaction declines, reaches a minimum around middle-age (between 40 and 50) and then rises again (Helliwell 2003; Blanchflower and Oswald 2004). A potential explanation for our contrasting result relates to the idea that the effect of age in subjective wellbeing might be relative to the life expectancy of the person. As our sample includes people with lower –or at least very different- life expectancies, this might mask the relation between changes in the life cycle of a person and subjective wellbeing. But overall, our findings indicate that there are many factors that determine the wellbeing of people in developing countries.

An important third finding of this work is that absolute income exerts a positive effect on subjective wellbeing, as expected (Frey and Stutzer 2002; Stevenson and Wolfers 2008). However, the magnitude of the association between absolute income and subjective wellbeing diminishes once we control for adaptation and social comparisons, although in most regressions both absolute income and social comparison variables maintain a positive and statistically significant effect when included simultaneously (see Blanchflower and Oswald (2004) for a similar result).

Thus, our data suggest that adaptation and social comparison variables are associated to subjective wellbeing on their own, giving support to the growing body of research arguing that the subjective wellbeing of people in developing countries is negatively affected by positional concerns (i.e., Guillen-Royo 2011; Knight and Gunatilaka 2012; Fafchamps and Shipi 2008; Knight et al. 2009; Fafchamps and Kebede 2008; Carlsson et al. 2009), as it is affected by absolute income. Furthermore, and contrary to what has been found in previous work in the developing world (e.g. (Akay and Martinsson 2011; Linssen et al. 2011; Asadullah and Chadhury 2012), the effects might be larger than the effects of absolute income.

Between the two measures tested, social comparisons (whether self-perceived and measured) have stronger effects on subjective wellbeing than adaptation. Furthermore, the inclusion of social comparison variables has a stronger lowering effect on absolute income than the inclusion of adaptation. This result contrast with findings by Angeles (2010), whose results in the UK strongly supported the existence of adaptation effects, but only found weak evidence in favor of social comparison.

Yet, why is it that the increasing prosperity of one part of the group might lead to decreases in the subjective wellbeing of others? The answer to that question might relate both to subjective and objective reasons. In other words, lower levels of wellbeing for the group whose income did not change might be due to well-known sociological factors related to the pervasive effects of income inequality. Research on income inequality suggests that the comparison with the better-off produces a sense of relative deprivation that might unleash negative emotions, such as envy, shame, guilty, anger, depression, hostility, cynicism, insecurity, social isolation, anxiety, and inadequacy (Marmot & Wilkinson 2001; Wilkinson 1997; Kawachi et al. 1997), all them contributing to worsen subjective wellbeing. But lower wellbeing might also have to do with objective changes in opportunities to avail of resources or services. For example, it is possible that the increase in income for some people in the group can drive up general prices, thus objectively worsening the situation of those who are left behind. Higher incomes might allow some people to invest in technology (i.e., chainsaw, rifle, tractors) that allows for a more efficient use of natural resources. If such resources are common access (i.e., forest, game, common pasture), the raise in income in one part of the group might result in decreased availability for those who are left behind. Whether subjective or objective reasons pay a more important role in explaining the effects of social comparison on subjective wellbeing is an interesting empirical question worth pursuing.

We also found that adaptation matters for feelings of wellbeing, although –in our sample- it matters less than social comparison. An interesting question derived from this finding is whether there is asymmetry in adaptation; income increase is associated to an increase in wellbeing, but is the feeling of decline in the sense of wellbeing of equal intensity for a decrease in income by the above amount? However, as the testing of such an idea, originally posed by Kahneman and Tversky (1979) and recently discussed by DiTella et al. (2010), requires panel data in this study we are unable to answer this question.

One more aspect merits discussion. A main difference in our regional analysis relates to the Latin American sample. Notice that, for this part of the sample, there is an overall lack of

statistically significant association between absolute income and subjective wellbeing. Furthermore, only the self-perceived social position of the household seems to play an important role in subjective wellbeing. Descriptive data show that this region is not only the richest in the sample, but also different in the distribution of households across the social comparison variables. Thus, respondents in Latin America show a different pattern from Africa and Asia, with a higher percentage of people reporting themselves in the "better-off" groups, and lower percentages in the "worse-off" groups. The differences might be explained for a larger concern about economic position in Latin American countries, which are among the most unequal in the world.

We are aware that our results may suffer from two main biases. First, unobserved factors (such as personality) might partially explain the associations found between adaptation and social comparison and subjective wellbeing (DeNeve and Cooper 1998; Steel et al. 2008). Just as positive affect--the hallmark of wellbeing—is believed to be the cause of many of the desirable characteristics, resources, and successes correlated with happiness (Lyubomirsky et al. 2005), people who are more optimistic would also be expected to be more positive about the relative situation of their household. Future research among low income populations should use panel data to control for the confounding effect of personality factors (which can be corrected via individual fixed effects if and when panel data are available) (Ferrer-i-Carbonell and Frijters 2004).

Second, there is an extended discussion on whether happiness is context-dependent or not. Some authors argue that happiness is an affective experience linked to universal human needs, which suggest that the conditions of happiness are similar across the world (although with some cultural variation), even if different countries and cultures give different meanings to the concept of happiness (Selin and Davey 2012; Eid and Diener 2001). Other authors, however, argue that contextual and cultural factors can affect whether emotions are considered valuable and appropriate across cultures, thus suggesting that some correlates of subjective wellbeing can be culture-specific (Diener and Oishi 2005; Diener et al. 2003). For instance, self-esteem has been found to be a much stronger predictor of life satisfaction of women in individualistic than in collectivistic societies (Diener and Diener 1995). This discussion obviously presents an important challenge in cross-cultural research on subjective wellbeing (including this one).

Conclusion

We conclude by highlighting some implications of our main finding. If subjective wellbeing depends partially on the gratification of basic physiological needs and partially on the gratification of social needs, there is no reason to believe that subjective wellbeing in rural areas of developing countries should not also depend on social comparisons. Our research findings suggest that -even at low levels of absolute income- adaptation and social comparison are important covariates of subjective wellbeing. This apparent universality of these mechanisms in their relation with subjective wellbeing has important implications for public policies aimed at poverty alleviation. On the one hand, our findings show that absolute income is important in itself. Thus, public policies aimed at increasing absolute income in populations with low income levels are certainly relevant in improving human

wellbeing. On the other hand, the relevance of social comparison for rural populations implies that there exists a negative externality to income-generating activities: gains in subjective wellbeing of those whose income increases are accompanied by decreases in subjective wellbeing of those in the comparison group (see Layard (2005)). Hence, public policies aimed at increasing absolute income should consider social comparison aspects, if they aim to also increase overall subjective wellbeing.

Acknowledgements

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Table 1

Absolute income[a] and its distribution across adaptation and social comparison levels

		Global (n=6973)		Africa (n=3742)		Asia (n=2361)		Latin America (n=870)	
[A]		*Mean*[b]		*Mean*		*Mean*		*Mean*	
Absolute income	Cash	1044 (1 948)		631 (1526)		1091 (1552)		2 693 (3224)	
	Subsistence	516 (1542)		437 (1954)		493 (499)		914 (1325)	
	Total	1555 (2730)		1062 (2733)		1580 (1704)		3602 (3809)	
[B]		*Mean*	*% hh*	*Mean*	*% hh*	*Mean*	*% hh*	*Mean*	*% hh*
Adaptation: Household's income compared to 5 years before	Worse-off	1057 (3250)	25	926 (4289)	31	1118*** (734)	21	2288 (1635)	11
	Same	1456 (2256)	34	985 (2016)	34	1475*** (1350)	38	3362 (3594)	28
	Better-off	2424*** (3382)	40	1515*** (2700)	35	2592*** (2953)	41	4585*** (4516)	61
[C]									
Social comparison: Self-perceived household position in *relation to other households*	Worse-off	1057*** (3247)	19	926 (4287)	20	1117*** (733)	23	2289 (1635)	6
	Average	1455*** (2255)	63	986 (2014)	64	1474*** (1350)	60	3362 (3594)	67
	Better-off	2421*** (3375)	18	1516*** (2696)	17	2588*** (2946)	17	4569*** (4513)	27
[D]									
Social comparison: Relative income	Below the mean	866*** (795)	66	540*** (504)	67	948*** (510)	64	2063*** (1149)	66
	Above the mean	2879 (4229)	34	2118 (4512)	33	2685 (2369)	36	6652 (5168)	34

***
Significant in a one-way ANOVA (or t-test comparison of means for [D], $p<0.001$

[a]All values are per adult equivalent in purchasing power parity adjusted USD.

[b]Standard deviation in parenthesis.

Table 2

Definition and descriptive statistics of control variables used in the analysis

		Global (n=6973)	Africa (n=3742)	Asia (n=2361)	Latin America (n=870)
Personal factors					
Female	Women answering the survey	25%	18%	36%	20%
Age	Age of the person, in years	44.1	45.0	43.3	42.7
Household size	Adult equivalents living in the household	4.1	4.5	3.6	3.8
Married	The informant was married at the moment of interview (versus widowed, divorced, never married)	88%	89%	89%	90%
Education	No schooling	35%	37%	38%	16%
	Primary school	29%	27%	27%	45%
	Secondary school	34%	32%	34%	37%
	Higher education	2%	3%	1%	2%
External factors					
Illness	Households where someone died or was seriously ill during the past 12 months	31%	36%	24%	32%
Work situation	Recently unemployed	3%	1%	6%	2%
	Major loss	45%	52%	39%	31%
	Own business	38%	59%	25%	24%
Social capital	*Help:* Households that can get help when in need	37%	33%	40%	47%
	Trust: Informants generally trusting village people	47%	43%	53%	47%
	Bonding capital: Households participating in forest user groups	27%	20%	42%	18%
	Bridging capital: Male household head belongs to village's largest ethnicity	77%	69%	86%	86%
Site income inequality	Gini index of site income inequality (n=52)[a], in regressions entered as %	0.38	0.40	0.33	0.40

[a] n= 23 for Africa, n=20 for Asia, n=9 for Latin America

Table 3

Results from Ordered Logit regressions. Absolute income, adaptation, and social comparison versus subjective wellbeing (n=6973)

		[a]	[b]	[c]	[d]
	Explanatory variables				
Absolute income, in logs		0.443	0.348	0.281	0.258
		(0.059)**	(0.061)**	(0.054)**	(0.100)*
Adaptation	*Worse than 5 years ago*		-0.826		
			(0.082)**		
	Better than 5 years ago		0.569		
			(0.092)**		
Social comparison: Self-perceived household position	*Worse than other households*			-1.214	
				(0.105)**	
	Better than other households			0.855	
				(0.106)**	
Social comparison:	Relative income				0.177
					(0.068)**
Control variables: Personal characteristics					
Female		-0.026	-0.005	0.008	-0.021
		(0.078)	(0.078)	(0.077)	(0.077)
Age	Age	-0.008	-0.007	-0.012	-0.008
		(0.011)	(0.010)	(0.010)	(0.10)
	Age squared	0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.0001)
Household size		0.097	0.081	0.047	0.100
		(0.018)**	(0.018)**	(0.018)	(0.018)**
Married		0.167	0.136	0.114	0.181
		(0.081)*	(0.072)	(0.078)	(0.081)*
Education (no schooling omitted)	Primary school	0.007	-0.021	-0.032	0.004
		(0.074)	(0.072)	(0.077)	(0.074)
	Secondary school	0.084	0.018	-0.059	0.074
		(0.081)	(0.078)	(0.084)	(0.080)
	High education	0.066	-0.027	-0.144	0.031
		(0.202)	(0.183)	(0.200)	(0.207)
Control variables: External factors					
Illness		-0.410	-0.350	-0.370	-0.406
		(0.087)**	(0.082)**	(0.086)**	(0.087)**
Work situation	Recently unemployed	-0.179	-0.111	-0.074	-0.171
		(0.299)	(0.299)	(0.294)	(0.300)
	Major loss	-0.252	-0.189	-0.252	-0.251

		[a]	[b]	[c]	[d]
		(0.068)**	(0.063)**	(0.071)**	(0.069)**
	Business	0.150	0.120	0.087	0.151
		(0.069)*	(0.069)	(0.064)	(0.067)*
Social capital	Help	0.208	0.127	0.091	0.206
		(0.099)*	(0.093)	(0.092)	(0.098)*
	Trust	0.450	0.428	0.448	0.457
		(0.093)**	(0.090)**	(0.087)**	(0.095)**
	Bonding capital	0.057	0.085	0.056	0.057
		(0.082)	(0.081)	(0.078)	(0.082)
	Bridging capital	-0.066	-0.027	-0.094	-0.063
		(0.087)	(0.084)	(0.083)	(0.085)
Site income inequality		-31.363	-31.287	-26.908	-24.013
		(2.85)**	(2.597)**	(2.776)**	(4.087)**
R2		0.10	0.12	0.13	0.10

Regressions include dummies for site. Standard errors are in parenthesis. *, ** significant at 0.05 and 0.01 levels. Variables are defined in Table 2.

Table 4

Results from Ordered Logit regressions. Dependent variable: subjective wellbeing

		[a]	[b]	[c]	[d]
	Africa (n= 3736)				
Absolute income, in logs		0.419	0.354	0.287	0.308
		(0.073)[**]	(0.076)[**]	(0.067)[**]	(0.124)[*]
Adaptation	*Worse than 5 years ago*		-0.738		
			(0.095)[**]		
	Better than 5 years ago		0.620		
			(0.114)[**]		
Social comparison: Self-perceived household position	*Worse than other households*			-1.321	
				(0.123)[**]	
	Better than other households			0.660	
				(0.108)[**]	
Social comparison:	Relative income				0.115
					(0.087)
	Asia (n=2361)				
Absolute income, in logs		0.636	0.478	0.389	0.231
		(0.117)[**]	(0.123)[**]	(0.099)[**]	(0.161)
Adaptation	*Worse than 5 years ago*		-0.982		
			(0.200)[**]		
	Better than 5 years ago		0.595		
			(0.225)[**]		
Social comparison: Self-perceived household position	*Worse than other households*			-1.200	
				(0.218)[**]	
	Better than other households			1.482	
				(0.229)[**]	
Social comparison:	Relative income				0.338
					(0.094)[**]
	Latin America (n=870)				
Absolute income, in logs		0.040	-0.048	-0.064	0.016
		(0.101)	(0.079)	(0.110)	(0.231)
Adaptation	*Worse than 5 years ago*		-0.715		
			(0.384)		
	Better than 5 years ago		0.448		
			(0.165)[**]		
Social comparison: Self-perceived household position	*Worse than other households*			-0.731	
				(0.405)	
	Better than other households			0.562	

		[a]	[b]	[c]	[d]
				(0.222)[*]	
Social comparison:	Relative income				0.022
					(0.154)

Regressions include the same control variables (including personal characteristics, external factors, and dummies for site and country) as in Table 3, but those are not reported here. Standard errors are in parenthesis. *, ** significant at 0.05 and 0.01 levels.