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Relative Economic Position and Subjective Well-Being in a Poor Society: Does Relative Position Indicator Matter?

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Abstract Concern for relative income (or status in general) may have important implications for poverty and individual well-being. This paper examines the impact of relative economic position on individual's level of well-being among poor communities in rural Ethiopia. The analysis uses a self-reported measure of overall life-evaluation as a measure of individual well-being. Despite the fact that well-being is multidimensional, the impact of non-money metric measures of relative economic position on individual well-being has not been given a lot of attention in the literature. In this study, relative economic position is measured using consumption data, asset index, and respondent's own perception of relative wealth. The asset index captures the non-monetary dimensions of economic welfare, including education, physical assets, and social capital. We use data from the 2004 and 2009 waves of the Ethiopia Rural Household Survey and employ a multilevel modelling technique to account for individual and group level heterogeneity in our empirical analysis. We find no significant relationship between individual well-being and relative economic position measured with in consumption terms. In contrast, we do find a significant negative impact of relative position on individual well-being when we use asset indices and respondent's own perception of relative wealth to measure relative economic position. Our findings suggest that when individuals compare themselves with others, they evaluate various aspects of their life, including their financial conditions, asset holdings, and social relations, which are hardly captured by consumption or income data in many poor countries.

Keywords Positional goods · Relative income · Subjective well-being · Multilevel modelling

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JEL Classification D62 · I31 · C23

1 Introduction

The notion that individuals care about their relative income (and status in general) has long been recognized in the social science literature (Duesenberry 1949; Runciman 1966; Easterlin 1974; Frank 2005; Knight and Gunatilaka 2012).[1] For instance, the relative income and relative deprivation hypotheses suggest that individuals feel relatively deprived or feel dissatisfied with their economic status once they realized that others are moving upward (Duesenberry 1949; Runciman 1966). Such comparison effects may, in turn, dictate some economic decisions made by individuals. For example, studies show that concern for relative income plays a crucial role in migration decisions (Stark et al. 2009; Vernazza 2013). Concern for relative income is also used to explain status-seeking expenditures among the poor (e.g. spending on festivals and funerals), which may led to lower saving rates (Rao 2001; Banerjee and Duflo 2007; Moav and Neeman 2012; Case et al. 2013). Similarly, low social status and the associated feeling of relative deprivation are related to negative health outcomes (Pickett and Wilkinson 2015).

In general, studies from developed countries find that relative consumption (or income) is negatively related with individuals' subjective measure of utility such as reported happiness or life satisfaction (Frey and Stutzer 2002; Clark et al. 2008; Easterlin et al. 2010). These finds suggest that although an increase in absolute income may increase happiness or life satisfaction initially, over time increase in happiness or life satisfaction will wear off as people adapt to the increased absolute income level. Thus, happiness or life satisfaction no longer increase with absolute income but relative income instead.

However, empirical studies examining the relationship between relative income and individuals' subjective measure of utility in poor countries find mixed results. Consistent with the relative income hypothesis, there are studies that find negative relationships between relative income and individuals' subjective well-being (SWB) in poor countries (Fafchamps and Shilpi 2008; Guillen-Royo 2011; Asadullah and Chaudhury 2012; Knight and Gunatilaka 2012; Alem 2013; Gori-Maia 2013; Fontaine and Yamada 2014). These findings suggest that individuals' subjective well-being or happiness increases as their absolute income/consumption increases and falls as the average reference group income/consumption increases. In contrast, others find no relationship between relative income and SWB (Akay and Martinsson 2011; Akay et al. 2012) suggesting that the poor care more about their absolute welfare and the absolute welfare of their community than their relative standing.

Some studies find that relative income is positively related with SWB. Different mechanisms are put forward to explain the positive impact of relative income on individual well-being. For instance, empathy and altruism can explain the positive effect of relative position found in some countries (Kingdon and Knight 2007; Bookwalter and Dalenberg 2010; Ravallion and Lokshin 2010). The suggested mechanisms in this literature are the presence of informal risk-sharing institutions in rural communities and other positive spillovers from having rich neighbours. In a related work, Senik (2004) in Russia also finds a positive effect of relative income on SWB. She ascribes her results to Hirschman and

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[1] The classic early references are Smith (1776), Marx (1849), and Veblen (1899) (as cited in Heffetz and Frank 2008). Other studies also modelled the interdependency of individual preference functions (see eg. Scitovsky 1976; Frank 1985; Leibenstein 1950; Pollak 1976; Neumark and Postlewaite 1998; Clark and Oswald 1998).

Rothschild's (1973) "tunnel effect" hypothesis, which posits that individuals may derive positive utility if they observe their reference group's income as a source of information for their future prospects.[2] In contrast to these findings, a recent study by Fontaine and Yamada (2014) in India show that both within cast and between-cast comparisons are negatively related with individual SWB. Fontaine and Yamada (2014: p. 415) argue that *"Envy thus appears to be stronger than fellowship feelings and informational effects".*

The mixed outcomes, however, could also reflect that culture/social norms may differently influence how relative position affects individuals' well-being (Diener et al. 2003). In addition, it is suggested that individuals' assessment of overall life depends on his or her satisfaction with various domains of life (Van Praag et al. 2003; Deaton and Stone 2013). However, we know little about whether relative position measured beyond income or consumption is related to SWB in poor countries. This paper builds on the previous research reviewed above and examines the relationship between relative economic position and SWB among poor communities. For this purpose, we use household panel data from rural Ethiopia, one of the world's poorest countries. According to the World Bank's recent estimates, Ethiopia's Gross National Income per capita in 2014 was only $550 (US$), while the average for low-income countries was $1638.

Unlike existing studies, which mainly use either income or consumption data to measure relative economic position, we use both consumption data and information on non-monetary welfare indicators to measure relative economic position. A growing number of studies (mainly from advanced countries) suggest that concern for relative position is more important in the case of positional goods, like houses and cars, than non-positional goods, like food, health, safety, leisure (Frank 2005; Solnick and Hemenway 2005; Carlsson et al. 2007; Bertram-Hümmer and Baliki 2015). These findings imply that income or expenditure data may not adequately reflect individuals' concern for relative position.

In poor countries, where households spend a large share of their household expenditure on food (Alem and Söderbom 2012; Regmi and Meade 2013), relative consumption spending of individual households is hardly observable to others in a reference group and relative economic position in observable assets and multiple dimensions may be more directly relevant for social comparisons. To capture this multidimensional aspect of relative economic position measures, we use information on different non-monetary welfare indicators and use multiple correspondence analysis (MCA) to derive an aggregate asset index. The asset indices include variables that capture non-income dimensions of welfare, including asset holdings, education status, financial conditions and social capital. Thus, using assets to measure relative position we test whether concern for relative position is more important in the case of non-income welfare measures like assets than income/consumption.

In addition, individuals' perceived relative position indicator is used as an additional proxy for relative wealth. It is argued that reported self-assessed relative position indicators are more important than objective relative position measures because perceived relative social status is what gives rise to feelings of relative deprivation than average consumption of others (Knight and Gunatilaka 2012; Posel and Casale 2011; Ravallion and Lokshin 2010). Using a self-assessed relative position measure we test whether individuals'

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[2] Using panel data from the UK, Brown et al. (2015) study also show that positive effect of relative position is observed when spatial reference groups are used in place of individual characteristics such as age groups. Brown et al. (2015), however, argue that the positive effect of relative income may well have been area wealth effects.

perceived relative position in their village is significantly associated with their reported life satisfaction, independently of an objective standard of living measures.

The rest of the paper is structured as follows. Section 2 describes the data and measurement issues. Section 3 presents the empirical strategies used. Results are presented in Sects. 4 and 5 draws conclusions.

2 Data and Measurements

2.1 Data Source

The study uses data from the Ethiopia Rural Household survey (ERHS), which is a rich panel dataset.[3] The ERHS used a two-stage stratified sampling design. In the first stage, 15 villages/peasant associations (PAs) were selected. Farming systems were used as a stratification base to select the 15 PAs from the Amhara, Oromia, SNNP, and Tigray regions of the country. In the second stage, a self-weighting sampling technique was used to select 1477 households randomly from the sampled villages. A detailed report on the ERHS methodology is provided by Dercon and Hoddinott (2011).We use data from the 2004 and 2009 waves because data on detailed self-assessed well-being indicators were collected only during these survey years. In these rounds, a matched panel of 1375 households participated. Household heads, which are the focus of this study, answered all survey questions.

2.2 Measurements

2.2.1 Subjective Well-Being

Following the standard approach in the SWB literature (Deaton and Stone 2013), SWB is measured using a life evaluation question. The life evaluation was determined by the respondent's answer to the question, "Suppose we say that the top of a ladder represents the best possible life for you and the bottom represents the worst possible life for you. Where on the ladder do you feel you personally stand at the present time?" Based on this quotation, household heads were asked to rate his or her current life condition on a ladder scale in which 0 indicates "the worst possible life" and 10 indicates "the best possible life". Here we expect that respondent household heads consider their household condition as a whole when ranking themselves in terms of SWB measures. This is the approach followed by other similar studies (see e.g. Knight et al. 2009; Ravallion and Lokshin 2010; Alem 2013). Figure 1 presents the percentage distribution of life evaluation responses. The SWB questions used in this study are identical in both survey rounds. In both periods, the distribution of responses to the life evaluation question is concentrated in the middle, with close to 72% of respondents placing themselves in the third, fourth, fifth, or sixth rungs of the life satisfaction ladder. In our empirical analysis, we combine code 0 with code 1 and combine code 10 and code 9 with code 8 due to the very low number of observations for codes 0, 9, and 10.
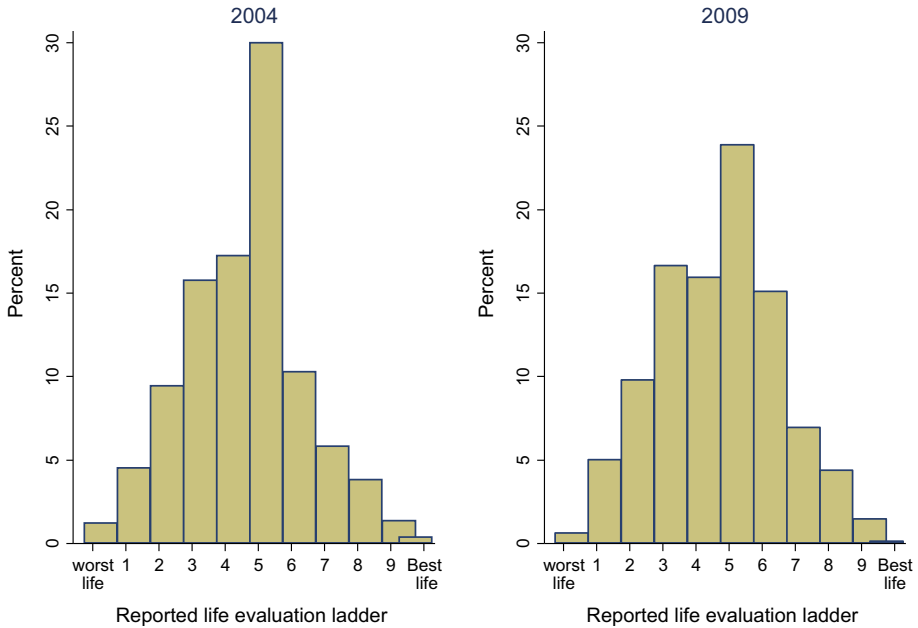
Fig. 1 Distribution of reported life evaluation ladder, 0–10 scale

2.2.2 Measures of Relative Economic Position

Studies that examine the effect of social comparison on SWB use various approaches to defining reference groups. These include neighbours, friends, co-workers, age groups, family members, race groups. For the purposes of estimation, this study assumes that the reference group consists of individuals/households living in the same village. Thus, we assume that respondents compare themselves with fellow villagers. A similar approach is used by other studies in the context of rural areas (Fafchamps and Shilpi 2008; Knight et al. 2009; Ravallion and Lokshin 2010; Clark and Senik 2014). For instance, in a study that asked individuals to choose their own reference groups, Knight et al. (2009) find that the majority of individuals (about 67%) in rural China identify fellow neighbours and villagers as their main comparison group. This is relevant in our case too, as farming is the main economic activity in rural Ethiopia, and household migration is very limited. In addition, family inheritance and land allocation by local officials are the two main sources of access to land in rural Ethiopia. For instance, among plots cultivated by the sample households in 2009 about 88% of them were acquired via allocation by local officials or family inheritance, with the average holding period being 23 years. This suggests that households do not actively choose who lives in their neighbourhood. In this context, we can assume that reference group formation (residency in a village) is not affected by individuals'/households' socioeconomic characteristics.

Two approaches are used to measure reference group economic position objectively. The first one is the mean of real per capita household consumption in a village (mean village consumption). It is suggested that consumption data provides a more accurate measure of welfare than income data in poor countries because consumption fluctuates less and, through transfers, one can have consumption without income (Fafchamps and Shilpi

2008). The data set provides information on real per capita consumption aggregates at the household level (both food and non-food consumptions). Food consumption includes, food consumed from own stock and gifts, and purchased food. The non-food consumption items mainly include direct consumables such as matches, soap, clothes (Dercon and Hoddinott 2011). Consumer prices, which were collected at the time of the survey in local markets were used to value consumption items expressed only in terms of quantities (Dercon and Hoddinott 2011: p. 17).

Although consumption is preferable than income in developing countries context, consumption measures also have limitations as a measure of individual welfare. Consumption data do not often capture some import aspects of individual welfare, such as welfare gains from goods and services provided or subsidised by the public sector (e.g. schools, health facilities, etc.), and other important dimensions of individual welfare such as livelihood security (Devereux and Sharp 2006). It is highlighted that access to various assets and the capabilities to utilise them are important factors in determining household welfare and livelihood security in rural areas of poor countries (Chambers and Conway 1992; Ellis 2000; Devereux and Sharp 2006). To capture this multidimensional aspect of individual welfare, we use the mean of asset index in a village (mean village asset index) as a second objective relative economic position measure in our analysis. Both mean village consumption and mean village asset index variables exclude the household of interest.

To get mean village asset holdings, we calculated an asset index for each household. The variables included in the asset index are: (i) natural assets (land holding size, livestock holdings),[4] (ii) other assets (ownership of hoe, plough, and radio), (iii) education levels (highest level of education in a household), (iv) saving and financial conditions (if a household stored any crop, could get access to 100 Birr[5] if needed, if a household had food shortage problems), (v) and social capital (whether any household member was a member of social networks such as equb (a traditional saving scheme), eddir (mutual burial service), or labour-sharing arrangements). These portfolio of assets (both material and social capital) are important for households to construct their livelihood strategies in rural settings (Chambers and Conway 1992; Ellis 2000). For aggregation of the assets within each household, we use weights derived from multiple correspondence analyses (MCA).The approach involves an application of a simple correspondence analysis algorithm to multivariate categorical data coded in the form of an indicator matrix or a Burt matrix (Greenacre 2010). It is suggested that the use of MCA is more appropriate than principal components analysis (PCA) when using categorical data or a mix of continuous and categorical data (Asselin and Anh 2009), which is the case in our data as only land and livestock holdings are continues variables.[6]

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[4] For each household, different livestock types transformed into a standard livestock unit known as a Tropical Livestock Unit (TLU).

[5] Birr is Ethiopian currency. 1 USD = 8.31 ETB in 2004, while 1 ETB = 8.96 USD in 2009.

[6] Results from the MCA show that the first dimension explains about 83% of the observed inertia in 2004 and 89.9% in 2009 (results not presented here). Thus, the first dimension explains a large proportion of the variance in the set of variables indicating the non-monetary welfare. Based on the first dimension poor households can be identified as those households with no educated household member, have small land and livestock holdings. They do not have assets such as radio and farming equipment (hoe and plough). They were not able to store crops from the previous harvest, have experienced food shortages, and they do not have access to cash if they need it. In contrast, rich households have family members with higher education, have more land and livestock, have assets (radio and plough), able to store crops from the previous harvest, can get access to cash if they need it, and they do participate in social networks (equb, edir, and labour sharing arrangements).

In using objective relative measures to measure relative position, we are assuming that individuals who have lower relative position are also emotionally affected by their status. However, Ravallion and Lokshin (2010: p. 178) argue that "Differences in the objective economic welfare of one's neighbours can hardly be relevant—either positively or negatively—to one's own welfare unless those differences are known and perceived as relevant by the person in question." Therefore, it is suggested that self-assessed relative position measures are expected to reflect the emotional reaction of an individual's concern for relative position better than objective measures (Ravallion and Lokshin 2010; Posel and Casale 2011). For this reason, in addition to the objective relative economic position measures, we also use respondents' perceptions of how their own current living standards compare to the average living standard in their village (Perceived relative wealth). Respondent's perception of their relative wealth in their communities (villages) was determined based on their answer to the following question, "Compared to other households in this village, would you describe your household as: (1) the richest in the village, (2) amongst richest in the village, (3) richer than most households, (4) about average, (5) a little poorer than most households, (6) amongst the poorest in the village, (7) the poorest in the village". We combine code 7 with code 6 and combine code 1 and code 2 due to the very low number of observations for codes 7 and 1.

2.2.3 Other Determinates of SWB

Beyond the relative economic position measures, individuals assessment of their overall life depends on their satisfaction with various domains of life, including family life, social capital, financial conditions, employment status, education, and other socio-economic characteristics (Van Praag et al. 2003; Brown et al. 2008; Deaton and Stone 2013; Helliwell et al. 2017). Absolute material well-being measures such as income or wealth are positively related with individual SWB (Frey and Stutzer 2002; Posel and Casale 2011), while job insecurity and unemployment are negatively related with SWB. Some studies also show that women reported lower SWB compared to men (Senik 2004; Posel and Casale 2011), while there exists a U-shaped relationship between age and SWB (Frey and Stutzer 2002; Helliwell et al. 2017). Likewise, social capital such as social support and social trust found to be positively associated with individual SWB (Posel and Casale 2011; Helliwell et al. 2017). For instance, Helliwell et al. (2017) argue that social support and trust are positively related with SWB by positively affecting health (both physical and mental) and higher income (by improving economic efficiency). To account for these factors, we controlled for various respondent and household level characteristics in our model.

The responded level characteristics include respondents' age (in years), gender (a dichotomous variable assigned 1 for women and 0 for men), education (a dichotomous variable assigned 1 if literate and 0 otherwise), and social capital indicators such as whether they trust their neighbours and rely on their neighbours if they need help (dichotomous variables assigned 1 if no and 0 otherwise). The household level characteristics include household living standard measures, access to off-farm income, the maximum level of education in a household, household size and composition, family health, and social capital. Household living standard measures included real household per capita consumption, land and livestock holdings, ownership of radio, and household financial condition. Household's financial condition is measured by asking respondents whether at least one family member could get access to cash if needed and whether the household stores crops currently (dichotomous variables assigned 1 if yes and 0 otherwise). The

maximum level of education in a household is a categorical variable scored 1 if no education, 2 primary level, and 3 high school and above. Access to off-farm income is measured using dichotomous variables assigning one if at least one member of a household had employed in off-farm activities (self-employed or employed) or get transfer income. Social capital is measured based on the question asking whether any household member was a member of social networks such as equb (a traditional saving scheme) or labour-sharing arrangements (dichotomous variables assigned 1 if yes and 0 otherwise). The status of family health is assessed by asking respondents if there was at least one family member who was ill within 4 weeks before each survey. Table 1 provides descriptive statistics for the variables used in our empirical analysis.

Table 2 presents average values of the SWB, subjective economic ladder, and perceived relative wealth indicators by deciles of household asset indices. The respondent's perception of economic welfare of a household (subjective economic ladder) was determined by the respondent's answer to the question, "Just thinking about your own household circumstances, would you describe your household as: (1) very rich, (2) rich, (3) comfortable, (4) can manage to get by, (5) never have quite enough, (6) poor, and (7) destitute?"[7]

The results suggest that average ranking of individuals based on the SWB and subjective economic ladder measures are monotonically related to objective economic rankings of their households (based on household asset indices). Individuals who are from richer households (based on assets), on average, reported higher SWB than others. Likewise, perceived relative wealth improves with more asset holdings. These results indicate that household heads take into consideration their household economic conditions as a whole when responding to the SWB questions. Thus, policies that affect household consumption and asset holdings would seem to affect individuals' welfare assessment.

3 Model and Estimation Strategies

According to Duesenberry's (1949) relative-income hypothesis, an individual's utility index (satisfaction) depends on the ratio of his/her own consumption (C) to a weighted average of consumption expenditure of others within a comparison group ($\bar{C}$), $U = f(C, C/\bar{C})$. Following the standard literature (Clark et al. 2008), our modelling was based on the utility function of the following form:

$$U_t = U\left(u_1(C_t), u_2\left(\frac{C_t}{\bar{C}_t}\right), u_3(X_{1t})\right) \tag{1}$$

where U_t is individual utility, C_t is own household consumption level, $\bar{C}_t$ is average reference group consumption (mean village consumption), X_{1t} indicates other socio-economic and demographic factors (including leisure time). Individual's utility, U_t, is approximated by their SWB measure. After partial log-linear transformation of Eq. 1, we specify the following model in order to estimate the relationship between individual SWB and relative economic status:

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[7] We combine code 7 with code 6, and combine code 1 and code 2 due to the very low number of observations for codes 7 and 1. For ease of interpretation, the scaling here is reversed from 1 (poor) to 5(rich).

Table 1 Variable descriptions and summary statistics

Variable	Descriptions	Mean	SD
Depended variable			
Life evaluation ladder	Response to the life evaluation question [coded from 1 (worst possible life) to 8 (the best possible life)]	4.4	1.77
Relative economic position			
Mean village consumption	Average log real per capita of consumption in a village	6.7	0.47
Mean village asset index	Average asset index in a village	2.8	0.75
Perceived relative wealth	Respondents perception of relative wealth in a village (coded from 1 the poorest to 5 the richest)	2.6	0.93
Other control variables			
Household living standard measures			
Household consumption	Real per capita household consumption (log)	6.5	0.8
Land holdings	Household Land holdings (in hectares)	0.5	0.46
Livestock holdings	Household Livestock holdings (TLU[a])	4	4.4
Own a radio	1 if there is a radio in a household; 0 otherwise	0.3	0.47
Can get cash (100 Birr)	1 if at least one person can get 100 Birr if needed; 0 otherwise	0.8	0.43
Store crops currently	1 if a household store crops currently; 0 otherwise	0.7	0.44
Subjective economic ladder	Respondents perception of their household living standard conditions (coded from 1 poor to 5 rich)	3.0	1.12
Household size and composition			
Male labour	Number of working age male family members	1.5	1.08
Female labour	Number of working age Female family members	1.5	0.93
Children	Number of Family members aged <15	2.5	1.84
Elderly	Number of Family members aged >65	0.3	0.54
Maximum education in a house			
No education	1 if all individuals have no education; 0 otherwise	0.3	0.43
Primary	1 if the maximum level of education is primary; 0 otherwise	0.4	0.49
High school and above	1 if the maximum level of education is high school and above; 0 otherwise	0.3	0.48
Access to Off-farm income			
Self-employed	1 if at least one person worked in self-emplyemt; 0 otherwise	0.4	0.48
Wage employed	1 if at least one person worked in wage-emplyemt; 0 otherwise	0.4	0.48
Get transfer payment	1 if at least one person got transfer payment; 0 otherwise	0.5	0.5
Family health			
Ill person in a house	1 if at least one person was ill within 4 weeks before each survey; 0 otherwise	0.5	0.5
Social capital			
A member of *equb*	1 if at least one person was a member of equ; 0 otherwise	0.2	0.36
Labour sharing	1 if at least one person participated in labour sharing; 0 otherwise	0.4	0.49

Table 1 continued

Variable	Descriptions	Mean	SD
Respondent characteristics			
Female	1 if female; 0 otherwise	0.3	0.45
Literate	1 if the respondent can read and write; 0 otherwise	0.4	0.49
Age	Respondents age in years	51	15
Do not rely on my neighbour	1 if respondents say that they could not rely on their neighbours to mail an important letter for them; 0 otherwise	0.2	0.4
Do not trust my neighbours	1 if respondents say that they cannot trust their neighbours to look after their houses if they are away; 0 otherwise	0.4	0.49

Source: Own calculations using ERHS (pooled, 2004 and 2009)

[a] TLU denotes Tropical Livestock Units

Table 2 Average SWB, subjective economic ladder, and perceived relative wealth

Deciles of household asset index	Life evaluation ladder	Subjective economic ladder	Perceived relative wealth
1-poorest	2.7	1.8	1.6
2	3.5	2.3	2.1
3	3.9	2.7	2.4
4	4.1	2.8	2.5
5	4.2	2.9	2.5
6	4.5	3.1	2.7
7	4.9	3.3	2.9
8	5.1	3.5	3.0
9	5.5	3.7	3.2
10-richest	5.9	4.0	3.4
Total	4.4	3	2.6

Source: Own calculations using ERHS (pooled, 2004 and 2009)

$$SWB_{ijt} = \alpha_1 \ln(C_{ijt}) + \alpha_2 \ln(\bar{C}_{jt}) + X'_{ijt}\beta + \zeta_i + \upsilon_j + \omega_{ijt} \qquad (2)$$

where SWB_{ijt} is the subjective well-being measure for individual i in village j at time t, ζ_i is individual level random intercept, υ_j is village random intercept, and ω_{ijt} indicates a random error term which is assumed to be distributed with zero mean and constant variance, and α_1, α_2 and β are parameters to be estimated. In Eq. 2, relative economic position is measured using average consumption expenditure of others within a village ($\bar{C}_{jt}$). Therefore, the coefficient α_2 offers a test of Duesenberry's (1949) relative-income hypothesis.

As discussed earlier, income or consumption are not the only relevant dimensions that people consider when they compare themselves with others. Thus, we also estimate the model using average asset holdings of others within a village (mean village asset index) as a second measure of relative economic position measure. Thus, the coefficient estimate on

the mean village asset index variable will allow us a test of whether concern for a relative position is more important in the case of non-income welfare measures like assets than consumption expenditure. In addition, we estimate the model using individuals' perceived relative position indicator as an additional proxy measure for relative wealth. By introducing the self-assessed relative position we will able to test whether individuals perceived relative position in their village is significantly associated with their reported life satisfaction, independently of an objective standard of living measures.

The issue of unobserved individual heterogeneity can be addressed by estimating the model with individual fixed effects (FE). However, individual fixed effects estimation requires that the dependent variable and the regressors should vary over time. In our case, 20% of the respondents have no time variation in the dependent variable. In such a case, FE estimator becomes inefficient (Bell and Jones 2015). In addition, some of our main variables of interest such as average consumption and asset holdings vary less within a village. Thus, we have clustering effects both over time and village. Failure to account for the presence of common group random effects (clustering) can generate estimated standard errors for the group level variable that are biased downward (Moulton 1990; Bertrand et al. 2004; Cameron and Miller 2015).

The common approach to dealing with multiway clusterings such as these contextual effects over time and village is to use a multilevel modelling (MLM) technique (Duncan et al. 1998; Nagengast and Marsh 2012; Rözer and Kraaykamp 2013; Zagorski et al. 2014). In line with this literature, we estimate Eq. 2 using a three-level random effects model to account for both individual random effects and village level random effects. In this model, occasions can be considered as level 1 measures nested in subjects/households, subjects/households can be considered as level 2 measures nested in villages, and villages as level 3 units. The model is estimated using a multilevel mixed-effects ordered probit regression and a multilevel linear mixed-effects regression. For comparison purposes, we also estimate Eq. 2 using a pooled OLS and pooled ordered probit approaches with cluster-standard errors (CRSEs) that are adjusted at village levels. Time fixed effects are included to control for the within-year clustering.

The standard MLM assumes that both individual and village level errors are not correlated with the included variables in the model. However, in our case, it will be unrealistic to assume that any unobservable village characteristics (e.g. land quality) relegated to the error terms should not be correlated with the observable mean village level consumption (or asset holdings). To correct for such potential endogeneity, we estimate the MLM including a Mundlak term (Mundlak 1978), average values (over village) of the subset of the variables in X. This approach controls for the correlation between unobserved time-invariant village fixed effects and the variables included in the model (Rabe-Hesketh and Skrondal 2012). The village level averages exclude village level consumption and asset index measures because these variables are also used as a measure of relative economic position in our model. After controlling for individual, household, and village characteristics, we assume that individual and village random effects are not correlated with the variables included in the model.

4 Estimation Results and Discussions

In this section, we present the estimation results of Eq. 2 based on the various model specifications. Table 3 presents estimation results from the multilevel linear mixed-effects model (MLM) with the Mundlak term included. We estimate six models. In Model 0, we

Table 3 SWB and relative economic position—a multilevel linear mixed-effects regression

Variables	Model 0	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	4.52***	2.48***	2.85***	2.09**	2.03**	3.35***
Mean village consumption		0.08	0.24*	−0.05	−0.03	−0.03
Mean village asset index			−1.15***	−1.05***	−0.99***	−0.66***
Household consumption				0.28***	0.27***	0.15***
Perceived relative wealth (base = the same)						
The poorest in a village						−1.74***
Poorer than average villager						−0.97***
Richer than average villager						0.78***
Mundlak term	No	Yes	Yes	Yes	Yes	Yes
Household characteristics	No	No	No	Yes	Yes	Yes
Respondent characteristics	No	No	No	No	Yes	Yes
Random-effects parameters						
Var (village)	0.22	0.04	0.06	0.05	0.05	0.02
Var (individual)	0.77	0.9	0.89	0.23	0.22	0.11
Var (residual)	2.16	1.89	1.88	1.83	1.82	1.51
Observations	2386	2386	2386	2386	2386	2386
Log likelihood	−4743	−4622	−4612	−4270	−4258	−3973
Prob >chi^2	–	0.000	0.000	0.000	0.000	0.000

Source: Own calculations using data from ERHS (2004 and 2009)

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

present the variance component model with no controls included. The estimated between-village variance is 0.22, while the between-individuals within-village variance is 0.77. The Intra Class Correlation (ICC) coefficients indicate that the proportion of the variance in individual SWB that stems from the between-village variation is 7%, while 31% of the variance in individual SWB is due to the between-subject within-village variation. Thus, the use of a three-level multilevel modelling is appropriate as it has been shown that Type-I error rates tend to be higher than 5% even with a very small ICC estimates, as low as 1% (Musca et al. 2011). The estimated variance of the SWB measure at the village level is relatively small although it is significant. Therefore, most of the variation in the measures of SWB is attributable to the individual/household and occasion level variations.[8] The

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[8] The magnitude of the ICC at the village level in our study is similar to those observed by other related studies. However, comparing ICC estimates across different studies might be a bit tricky as different studies use different levels of analyses (most use two-level modelling). In addition, estimates of ICC could vary across different studies due to variations in the extent of sample homogeneity. For instance, using a three-level multilevel modelling (i.e. individuals nested in households and households nested in districts) a study by Ballas and Tranmer (2012) find that the proportion of the district level variance from the total variance for individuals SWB measure is 9.4%, while the figure is 14.63 and 84.44% for household and individual level variances. The corresponding figures for a happiness measure are 0, 8.2, and 91.8% respectively. Using a two-level multilevel modelling (individuals nested in countries), Novak and Pahor (2017) find that the proportion of the variance due to the level 2 variable (country) is 7.6%. Likewise, using a two-level multilevel modelling (individuals nested within country-period combinations) Rözer and Kraaykamp (2013) find that the ICC at the country-year level is 18.1%.

variance at the village level and individual levels are reduced considerably after the introduction of village and individual/household level explanatory variables.

All models with the exception of Model 0 include the Mundlak term. Model 1 controls for mean village consumption, and the mean village level asset index variable is introduced in Model 2. Model 3 augments model 2 by including household level living standard measures such as household consumption and other household level control variables. In Model 4, we added respondents' characteristics (age, sex, education, and perception of trust and help). In Model 5, we augmented Model 4 by including respondents' self-assessed relative position indicator (perceived relative wealth). In order to make these results easier to digest, only coefficient estimates on own consumption and relative position measures are presented in Table 3. The coefficient estimates on other control variables are presented in the "Appendix" (Table 5) based on Model 5 specification.[9]

Before we turn to a detailed discussion of the relative position measures, we begin by discussing how SWB is related with other control variables. The coefficient estimate on the variable indicating household consumption is positive and its coefficient is significantly different from zero in all model estimates. These results suggest that SWB increases with household consumption expenditure, which is consistent with findings from similar studies in the literature (e.g. Ferrer-i-Carbonell 2005; Fafchamps and Shilpi 2008; Knight et al. 2009; Ravallion and Lokshin 2010). In addition, coefficient estimates on other household living standard measures such as more land and livestock holdings and access to cash and saving (store crops) are positive and statistically significant (Table 5 in the "Appendix"). In contrast, lack of support from neighbours and having a family member in a wage employment are negatively associated with SWB. The negative relationship between wage employment and SWB is not surprising given that local off-farm jobs are poorly developed in rural Ethiopia and it is poor households that are more likely to participate in local off-farm wage employments (see Shifa 2016).In general, these results indicate that better socio-economic conditions are associated with reporting higher SWB.

Looking at our main variable of interest, relative economic position, the coefficient estimate on mean village consumption variable is not significant in all model estimates, except in Model 2 (Table 3), in which case it is marginally significant. In contrast, in all cases, the coefficient estimate on the mean village level asset index variable is negative and statistically significant (at 1% level of significance). These results suggest that after controlling for absolute living standard measures, higher relative asset holdings in a village is negatively related with individual SWB. In contrast, relative position measured using consumption has no significant impact on individual SWB.

Our finding is in contrast with previous studies suggesting that relative consumption has a significant negative effect on SWB in the context of some poor countries (e.g. Fafchamps and Shilpi 2008 in Nepal; Fontaine and Yamada 2014 in India). One potential reason for the inconsistency in these findings is that, for different studies, consumption data may include different bundles of goods. For instance, in both studies (Fafchamps and Shilpi 2008; Fontaine and Yamada 2014), consumption data includes expenditure on both non-durable and durable items, while in our case the consumption data only includes households' expenditure on food and other non-durable items. This implies that our consumption

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[9] Since both the direction of the effect and significance of the variables are similar in the multilevel linear mixed-effects model and the multilevel mixed-effects ordered probit model estimates we report estimation results from the multilevel mixed-effects ordered probit regression only based on Model 5 specification (Table 5 in the "Appendix"). Table 5 in the "Appendix" also presents estimation results using a pooled OLS and pooled ordered probit approaches with cluster-standard errors (CRSEs) that are adjusted at village levels.

data do not seem to adequately capture other important dimensions of welfare. Thus, when we use assets to measure the relative position our results are consistent with previous findings suggesting that relative position has a significant negative impact on SWB in poor countries.

In Model 5 we introduce the self-assessed relative position measure, which captures respondents' perception of how their household current living standards compare to the average living standard in their village. The estimated coefficient on this variable is significant (at 1% level of significance). Results suggest that individuals who perceive themselves as poorer than the average villager are less likely to report higher SWB, while those who perceive themselves as richer than the average villager are more likely to report higher SWB. In addition, the size of the absolute value of the coefficient estimate on the perception of being the poorest in the village is larger than the coefficient on either perceiving being poorer than average villager or being richer than average villager. These results are consistent with the suggestion that individuals value losses more than gains (Duesenberry 1949; Knight and Gunatilaka 2012; Ferrer-i-Carbonell 2005; Kahneman and Tversky 1979). The estimation results in Model 5 suggest that after adjusting for objective economic indicator measures, higher perceived relative wealth is positively associated with SWB.

Overall, our results suggest that self-assessed relative position measure and mean relative position measured based on the asset index variable are strong predictors of SWB. However, one potential problem with using mean village consumption (or assets) in estimating the effect of relative position on SWB is that geographically correlated measurement error in household consumption (or asset) may lead to spurious relative position effect (Fafchamps and Shilpi 2008; Ravallion and Lokshin 2010). This problem can be corrected by either instrumenting the mean consumption (or mean asset) and the own-consumption (or own-asset) variables (e.g. Fafchamps and Shilpi 2008) or by using an alternative measure of own economic welfare measure such as respondent's perception of own economic welfare than consumption (Ravallion and Lokshin 2010: p. 178). Since we do not have a suitable instrument for these variables in our data, we opted for the second approach.

We use the indicator that asked respondents explicitly to evaluate economic welfare of their households without referring to others in their villages. We reestimate Eq. 2 using the subjective economic welfare indicator instead of the objective economic measures. Table 4 presents estimation results from the MLM model using the same specifications as it is in Table 3, except in this case household characteristics excludes objective living standard measures such as household consumption, land, and livestock holdings.

Results in Table 4 confirm what we find in Table 3. The coefficient estimate on mean village consumption is not significant in all cases, while the coefficient estimate on the -mean village asset index variable is negative and statistically significant. Likewise, the coefficient estimate on the perceived relative wealth variable remains highly significant, albeit the coefficient becomes smaller in size. Results also show that respondent's perception of economic welfare is a strong predictor of SWB. Individuals who perceive their households as poor are less likely to report higher SWB, while those who perceive their households as rich are more likely to report higher SWB. Overall, our results suggest that after controlling for various household and individual level factors, the self-assessed relative position measure and mean relative position measured based on the asset index variable are strong predictors of SWB. However, the estimated variance of the SWB measure at the village level is relatively small (although it is significant) suggesting that

Table 4 SWB and relative position (with subjective own economic welfare measure)- a multilevel linear mixed-effects regression

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	3.76***	3.95***	3.64***	3.70***	3.83***
Subjective economic ladder (base = can manage)					
Poor/destitute	−1.68***	−1.68***	−1.56***	−1.54***	−0.77***
Never have quite enough	−0.85***	−0.85***	−0.77***	−0.76***	−0.29***
Comfortable	0.93***	0.92***	0.88***	0.88***	0.63***
Rich/very rich	1.88***	1.86***	1.75***	1.73***	1.21***
Mean village consumption	−0.05	0.06	0.03	0.04	0.04
Mean village asset index		−0.72***	−0.68***	−0.65***	−0.52**
Perceived relative wealth (base = the same)					
The poorest in a village					−1.23***
Poorer than average villager					−0.76***
Richer than average villager					0.49***
Mundlak term	Yes	Yes	Yes	Yes	Yes
Household characteristics	No	No	Yes	Yes	Yes
Respondent characteristics	No	No	No	Yes	Yes
Random-effects parameters					
Var (village)	0.037	0.042	0.043	0.045	0.023
Var (individual)	0.216	0.217	0.185	0.171	0.118
Var (residual)	1.551	1.543	1.525	1.523	1.448
Observations	2386	2386	2386	2386	2386
Log likelihood	−4080	−4075	−4044	−4033	−3933
Prob > chi^2	–	0.000	0.000	0.000	0.000

Source: Own calculations using data from ERHS (2004 and 2009)

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

most of the variation in the measures of SWB is attributable to the individual and occasion level variations.

5 Conclusions

In this paper, we examine whether individual's relative economic position is related to their self-assessed well-being among poor communities using panel data from rural Ethiopia. We use per capita household consumption expenditure, other non-monetary welfare indicators (assets), and respondent's perception of relative wealth to measure relative economic position. Our findings conform to previous literature suggesting that better own living standard condition measured by consumption, asset holdings, or subjective economic welfare is associated with higher self-assessed well-being (Ferrer-i-Carbonell 2005; Fafchamps and Shilpi 2008; Knight et al. 2009; Ravallion and Lokshin 2010). However, we find that the relationship between relative economic position and individual well-being depends on how we measure relative economic position.

On the one hand, we find that after controlling for own level of consumption and other factors, mean village consumption has no significant impact on individuals SWB. On the other hand, we find a significant negative effect of relative economic position on individuals SWB when we use asset indices to measure the relative economic position. Likewise, using a self-assessed relative position indicator we also find that perceived lower relative ranking compared to others in a village is associated with lower individual SWB. These results are robust to changes in model specifications and estimation methods.

The negative relationship between relative economic position measured using assets and individuals SWB suggests that keeping other factors constant, individuals' SWB is lower if they live in a village where other individuals' living standards (measured using asset indices) is higher. One potential explanation is that living in a village with a higher average living standard might increase one's aspiration levels, which in turn may reduce individuals SWB due to comparisons effects. For example, Stutzer (2004: p. 97) show that individuals income aspirations increase with average income level in a community where they live in. And higher aspiration levels associated with lower life satisfaction.

Our findings add support to a literature suggesting that concern about relative position is important for individuals in poor countries as it is in rich countries (Fafchamps and Shilpi 2008; Knight and Gunatilaka 2012; Alem 2013; Fontaine and Yamada 2014). One potential reason for the lack of evidence for the relative income hypothesis using consumption data in our study is may be due to the fact that our consumption data do not seem to adequately capture other dimensions of relative deprivations, which are relevant for social comparisons. This is a possible explanation because we find a strong negative effect of relative economic position on individual well-being when we use assets to measure the relative economic position than consumption. Thus, consistent with other findings in the literature (Frank 2005; Knight and Gunatilaka 2012; Cuesta and Budría 2014; Bertram-Hümmer and Baliki 2015), our findings suggest that relative economic position measured using perceived relative wealth or observable assets may better reflect individuals' concern about relative position than income or consumption.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Appendix

See Table 5.

Table 5 Determinants of subjective well-being

Variables	Pooled OLS CRSEs	Pooled Ordered probit CRSEs	MLM linear	MLM ordered probit
Relative economic position				
Mean village consumption	0.14	0.11	−0.03	−0.03
Mean village asset index	−0.12	−0.1	−0.66***	−0.56***
Perceived relative wealth (base = the same)				
The poorest in a village	−1.78***	−1.42***	−1.74***	−1.47***
Poorer than average villager	−1.00***	−0.77***	−0.97***	−0.79***
Richer than average villager	0.83***	0.64***	0.78***	0.64***
Household living standard measures				
Household consumption	0.16***	0.13***	0.15***	0.13***
Land holdings	0.15**	0.12**	0.21***	0.19***
Livestock holdings	0.05***	0.04***	0.06***	0.05***
Own a radio	0.07	0.05	0.04	0.03
Can get cash (100 Birr)	0.41***	0.33***	0.32***	0.27***
Store crops currently	0.24**	0.19***	0.23***	0.19***
Household size and composition				
Male labour	0.04	0.03	0.04	0.04
Female labour	0.00	0.00	0.00	0.00
Children	0.05**	0.04**	0.04**	0.04**
Elderly	0.01	0.01	0.01	0.01
Maximum education in a house (base = no education)				
Primary	−0.02	−0.01	0.03	0.02
High school and above	0.09	0.08	0.14	0.12
Access to off-farm income				
Self-employed	0.00	0.00	−0.01	−0.01
Wage employed	−0.16**	−0.13***	−0.11*	−0.09*
Get transfer payment	−0.11*	−0.09*	−0.04	−0.03
Social capital				
A member of *equb*	0.05	0.04	0.12	0.1
Labour sharing	0.07	0.06	0.00	0.01
Family health				
Ill person in a house	−0.02	−0.01	−0.04	−0.04
Respondent characteristics				
Age	0.00	0.00	−0.01	0.00
Female	−0.09	−0.07	−0.08	−0.07
Literate	0.06	0.05	0.03	0.02
Do not rely on my neighbours	−0.23***	−0.18***	−0.23***	−0.19***
Do not trust my neighbours	−0.09	−0.07	−0.11*	−0.09*
Observations	2386	2386	2386	2386
Adjusted R-square	0.454	0.159	–	–
Log likelihood	−4006	−3879	−3967	−3839

Table 5 continued

Variables	Pooled OLS CRSEs	Pooled Ordered probit CRSEs	MLM linear	MLM ordered probit
Prob > chi^2	0.000	0.000	0.000	0.000

Source: Own calculations using data from ERHS (2004 and 2009)

MLM Linear refers to a multilevel linear mixed-effects regression, MLM ordered probit refers to a multilevel mixed-effects ordered probit regression, Pooled OLS CRSEs refers to a pooled OLS with cluster-standard errors (CRSEs), and Pooled Ordered probit CRSEs refers to a pooled ordered probit with cluster-standard errors

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

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