The anatomy of poverty perceptions in Morocco : what is the role of local comparisons and intra-household inequalities?

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Abstract

To a large extent, political protest and popular discontent in Morocco is disconnected from objective living standards. We study the determinants of poverty perceptions in a nationally representative panel data set of households. We find that perceptions of poverty is influenced by relative concerns, and that the sign of income comparisons depends on the geographical scale: positive for close neighbors, negative for more distant ones. The channels of the comparison effects are investigated, as well as the effect of intra-household nutrition inequalities. We find that intra-household inequalities influence negatively the perception of poverty, implying barriers to equal distribution of resources

1 Introduction

One of the most consistent findings of "happiness economics" is that the relation between material standards of living and subjective well-being is, to a large extent, a *relative* phenomenon. It is not so much the absolute amount of my income or consumption that matters for my happiness, but the amount relative to others. A large literature has shown that *relative income* has an equal or even stronger effect on subjective well-being that absolute income: Stutzer (2004); Clark and Senik (2010); Di Tella et al. (2010). Income comparison may be one explanation for the 'paradox' of stagnating happiness levels across countries, despite there being a positive correlation between income and happiness withing countries. (Easterlin, 1995; Clark et al., 2008). The policy implications of these findings are wide-ranging: they imply that an exclusive focus on economic growth is neither necessary, nor sufficient to improve the human lot (Frank, 2001; Layard, 2005).

The issue of comparison effects has been less intensely studied in the context of developing countries, probably for lack of data on subjective well-being. Another reason might be that this research program has inconfortable implications for anti-poverty policies. As noted by Ravallion and Lokshin (2010), if happiness really is relative, then economic growth may fail to increase a society's level of well-being, if relative positions are unchanged. Thus, it is somewhat of a relief that most authors studying subjective well-being in developing countries fail to find negative comparison effects (Senik, 2004; Bookwalter

and Dalenberg, 2010; Knight and Gunatilaka, 2010; Lentz, 2017). Some of these papers come up with, *positive* comparison effects: the better-off my neighbors are, the happier I feel.

In this paper, we study a closely related issue: the subjective perception by household of their standard of living [1]. It is now widely accepted that absolute, monetary poverty lines fail to capture the entirety of the experience of living in poverty (Banerjee and Duflo, 2007; Stiglitz et al., 2009); yet the debate about the relative merits of "multidimensional" poverty lines versus a "dashboard" approach of development indicators is still ongoing (Alkire et al., 2015; Ravallion, 2011). The use of subjective measures of poverty and well-being may constitute a middle ground between these two approaches. They may be used to calibrate multidimensional poverty indices, thus sidestepping the inherent arbitrariness of "dual cutoffs" approaches à la Alkire and Foster (2011), while retaining the advantage of allowing trade-offs between different dimensions of development (van Praag and Ferrer-i Carbonell, 2008; Ravallion, 2008; Pattanaik and Xu, 2018).

Moreover, multidimensional as well as monetary poverty indicators have the inherent weakness that they are measured at the household level of the household, while what we are ultimately interested in are individuals. Recently, several papers have tried to go beyond unitary household assumptions to measure poverty, be it monetary or multidimensional, at the individual level, and taking into account intra-household inequalities : cf. Brown et al. (2017); De Vreyer and Lambert (2016); Espinoza-Delgado and Klasen (2018).

This paper studies these issues in the context of Morocco in the recent period. Once one of the poorest countries in the Middle East and North Africa (MENA) region, the country has experienced a period of uninterrupted growth since the mid-nineties, and has known a drastic reduction of the proportion of its population living in extreme poverty (Chauffour, 2017). The country is reputed to enjoy a strong degree of political stability, emerging relatively unscathed from both the global financial crisis and the Arab spring (Vergne, 2014). Yet, political discontent is widespread, as witnessed in extremely low participation rates in national elections, and the country is experiencing local protest movements on a regular basis since 2011.

One noteworthy aspect of these protests is that they generally do not originate in the most economically destitute places in the Kingdom. The anti-cronyism demonstrations of 2011 were mostly held in big, relatively well-off cities (Casablanca, Rabat, and Tangiers). More recently, several protest movements took place in the *Rif*, a region under-equipped in public infrastructure, but whose inhabitants enjoy above-average standards of living due to high remittances receipts. Conversely, sociologists have observed that the residents of destitute rural areas remain staunch "champions of the Alaouite throne" (Leveau, 1976).

The study of poverty perception is likely to shed lights on the underlying reasons for popular discontent in cities and stability in the countryside. In this paper, we make use of a new, nationally representative panel of households to study the determinants of subjective poverty over the 2012-2015 period. We focus particularly on comparison effects at various levels (village, neighborhood and county) and on intra-household nutrition inequalities.

[1] Some existing papers, e.g. Lentz (2017) or Ravallion and Lokshin (2010), use the terms "subjective well being" and "subjective poverty" interchangeably

In line with a recent literature on local comparisons (Deaton and Stone, 2013; Brodeur and Flèche, 2017; Ifcher et al., 2018), we find that the the direction of the 'income comparison effect' varies with the geographical reference scale: it is positive in neighborhoods or villages, but negative in more remote comparison areas (provinces). Moreover, income comparisons have a stronger effect on well-being in rural areas. We investigate two of the channels through which these comparison effects might occur, and find no support for the channel of local public good effects. Moreover, income comparisons do not increase with the degree of community engagement of household members, suggesting a role of direct, "other-regarding" preferences. Finally, we show that perceptions of poverty are influenced by intra-household BMI inequalities, suggesting that there are barriers to household redistribution that lie beyond the household's command. Our results are robust to various panel data specifications that control for possible sources of bias such as omitted variables linked to personality or perception.

The remainder of the paper is structured as follows. Section 2 reviews the relevant literature related to our study. Section 3 presents our data source and details our empirical methodology. Section 4 presents descriptive statistics, and section 5 the results of our estimations. The last section concludes.

2 Relevant literature

Subjective well-being and comparison income The research on the correlates and the determinants of happiness, or "Subjective Well Being" (henceforth SWB) has become an important and lively research field in the past ten years (e.g. Di Tella and MacCulloch, 2006; Deaton, 2008). One of the salient findings of this line of research is that SWB appears to be *reference dependent*: declaring oneself to be happy is intimately linked with the notion of comparison, as the answer to the question "how do I compare to some reference point". The reference point itself has been hypothetized to be of a dual nature (Clark et al., 2008): both *internal* (how do I compare to myself, in the past or in the future?) and *external* (how do I compare to relevant others). The former dimension (comparison to oneself in the past and in the future) gives rise the phenomenon of adaptation to higher income or to shocks (Di Tella et al., 2010; Clark et al., 2008); while the latter dimension (comparison to others) has been linked to the phenomenon of 'comparison income' (e.g. Senik, 2004; Clark and Senik, 2010; Ifcher et al., 2018): what matters for my own perceived well-being is not so much my income or consumption *per se*, but how much higher it is than that of relevant others.

The fact that SWB has an important relative dimensions has been advanced as a potential explanation for the so-called 'Easterlin Paradox' (Easterlin, 1995) of stagnating aggregate levels of happiness in industrialized countries (Clark et al., 2008): past some threshold, if the income of all individuals progress at the same rate, absolute income increases but relative income stay flat[2].

The relativity of well-being and the comparison income effects raise ethical questions and have important policy implications[3]. Most saliently in the case of developing countries, it would imply that an increase in the standards of living of the whole population would be neither necessary, nor sufficient, to guarantee

[2] note however that new and better data has put the existence of the paradox into question, cf. Stevenson and Wolfers (2008)

[3] see e.g. Decancq et al. (2015) for a survey of the ethical issues that come with treateing subjective well being as a measure of welfare

higher levels of well-being of the population (Ravallion, 2014).

Faced to this question, a relatively small number of papers has tackled the issue of SWB and comparison effects in developing countries: Senik (2004) in the context of post-communist transition Russia, Tao and Chiu (2009) for Taïwan, Bookwalter and Dalenberg (2010) for South Africa, Ravallion and Lokshin (2010) for Malawi, Knight and Gunatilaka (2010) for China, Castilla (2012) for Mexico, Lentz (2017) for Ghana. The relative scarcity of the papers on SWB in the context of developing countries probably reflects the lack of data on these issues, which is somewhat surprising given the breadth of issues that SWB/happiness and life satisfaction data can be applied to: health (Deaton, 2008; Oshio and Kobayashi, 2010), contract farming (Dedehouanou et al., 2013), labor market issues (Falco et al., 2015), and poverty measurement (Razafindrakoto and Roubaud, 2005; Ravallion, 2014; Dat et al., 2015).

Regarding the issue of comparison income, the results of the existing studies on developing countries are more mixed than those in the context of industrialized nations. Some studies fail to find a significant negative effect of comparison income, except for a subset of urbanized, fairly well-off households (Tao and Chiu, 2009; Bookwalter and Dalenberg, 2010; Castilla, 2012). Other studies (e.g. Senik, 2004; Ravallion and Lokshin, 2010; Lentz, 2017) even find that for the poorest, the income of the relevant comparison group is associated with a higher level of SWB. This is consistent with the large literature on risk sharing in developing countries context, which typically shows that poor household rely on their social network to counteract the negatives consequences of shocks to their livelihood (Fafchamps and Lund, 2003; Fafchamps and Gubert, 2007). Note however that in the context of Senegal and with panel data, Dedehouanou et al. (2013) do find a negative effect of comparison income on SWB.

In earlier studies on relative deprivation, the "comparison income" (the income against which the individual was supposed to compare himself) was defined by the analyst in one of two ways : either as the mean or median income in the geographic vicinity of the individual, or as the income predicted from a Mincerian wage equation (e.g. Senik, 2004; Stutzer, 2004). Recent papers have tried to unpack the concept of reference group through detailed survey instruments (Ravallion and Lokshin, 2010; Bookwalter and Dalenberg, 2010). Most recently, Lentz (2017) used social network data on gift receipts and trust to construct a measure of "functions-based" reference groups. She finds that compared to spatially defined reference group, the comparison effect for the social network is positive. In the same vein, Ifcher et al. (2018) shows that, in the US, the comparison effect changes sign when the comparison income is defined at the local level (ZIP-code) compared to a more agregated geographical scale (the MSA area, a sub-county subdivision larger than the ZIP code). The authors interpret this as evidence that it is positive externalities of neighbours through local amenities that matter for perceptions of life satisfaction. Deaton and Stone (2013) find similar results.

Multidimensional poverty measurement and analysis Commonly used poverty lines based on consumption or income have been criticized on several grounds. They have trouble dealing with goods for which markets are non-existent or for which market prices do not reflect the value they provide for households: self-consumed goods, durable goods, or public goods or publicly provided private goods (Deaton, 1997; Ravallion, 2008). These problems are particularly salient in poorer countries, where a larger part of household consumption come from self-production, and were missing markets and lack of

competitions is arguably more prevalent than in a developed country context.

Faced with this issue, economists have expanded a lot of efforts into devising so-called "multidimensional" poverty indices (Tsui, 2002; Bourguignon and Chakravarty, 2003). In particular, the so-called "dual cutoff" approach, after Alkire and Foster (2011), has attracted the attention of international institutions such as the UNDP and has been implemented by numerous national statistical agencies (Alkire et al., 2015). The approach basically consists in defining a household as "multidimensionally poor" if they are below a certain number of thresholds in a minimum number of dimensions. This method has the advantage approach of allowing for some trade-off between the various "dimensions" of poverty, contrary to the polar cases of the "union" and "intersection" approaches required by dominance-based multidimensional poverty measures (Duclos et al., 2006). It allows for the possibility that a person may be deprived overall even when she is not deprived in all dimensions as well as the possibility that a person may be non-deprived overall even when she is deprived in some dimensions (Pattanaik and Xu, 2018).

Yet the multidimensional poverty measured based on the dual cutoff approach suffer a number of weaknesses, the most obvious one being that the choice of the dimensions, the cutoffs both within the dimensions and in the number of dimensions in which to be deprived in order to be considered as poor are all essentially arbitrary[4]. They are defined by the analyst in a "top-down" fashion, and thus are vulnerable to the critic of being unscientific and reflecting mostly the analysts preferences (Ravallion, 2011). Moreover, the Alkire-Foster method has other theoretical weaknesses, such as the fact that in the aggregation step (in constructing a society-wide measure of poverty), it does not put a higher weight on people that have more deprivations than others (Pattanaik and Xu, 2018). Finally, empirical analyses show that there is a lot of overlap in the information contained in the various "dimensions" of the most used version of the Alkire-Foster "methodology", the MPI, thus reaching the conclusion that " there might not actually be so much multidimensionality within the dimensions of the MPI" (Pasha, 2017).

Faced to these problems, subjective poverty measurement has been noted as an opportunity to find a middle ground between dashboard-based approaches of poverty correlated on the one hand and multidimensional poverty indices on the other hand. The idea is that directly asking individuals "do you feel poor?" can be used, not as a poverty line *per se* but as a basis to calibrate multidimensional poverty lines (Ravallion, 2014; van Praag and Ferrer-i Carbonell, 2008). Examples of this endeavour include Herrera et al. (2006) and Dat et al. (2015).

3 Data and methodology

3.1 Data

We use data from the three first waves of the *Enquête panel de ménages* collected by the Moroccan National Observatory for Human Development (ONDH). The baseline sample was collected in 2012, ans was designed to be nationally representative, as well as representative of urban and rural areas

[4]this issue is also present for "monetary" poverty lines, but in the case of "multidimensional" the arbitrariness is compounded by the number of dimensions to be considered.

populations. The baseline sample comprises 8000 households, of which 7892 are actually exploitable, for a total of 37844 individuals. Follow-up waves were collected in 2013 and 2015.

The *Enquête panel de ménages* follows the structure of an LSMS-type survey, with a household roster, modules on labor market, education, and health, a specific module on reproductive and maternal health, a consumption module, as well as information on household durables, housing characteristics, credit incurred by the household, livestock and poultry and landholdings.

More relevant to our question, the survey also comprises a module about civic participation and solidarity, as well as a module on the perception of poverty ("subjective poverty"). Our main dependent variable, *subjpov*, is the answer to the following question "Do you feel that you belong to : (1) the poorest households (2) somewhat poor households (3) middle-class households (4) somewhat well-off households (5) well-off or rich households". We also make use of the answer to the Minimum Income Question (MIQ) : "according to you, how much does a household of similar composition than yours have to spend, per month, in order not to be considered poor". The subjective poverty module is answered by one person per household, generally the household head.

The literature on economic psychology has distinguished between two different dimensions of subjective variables related to well-being and happiness: an *evaluative* dimension ("on a scale of 0 to 10, 0 being the worst possible life for you, and 10 being the best possible, how do you rank yourself?") and an *hedonic* dimension ("did you experience a lot of happiness today"); the former measures are much more stable, while the latter reflects much more day-to-day variations (Kahneman and Krueger, 2006; Deaton and Stone, 2013). With regards to this typology, the formulation of our measure of subjective poverty reflects mainly the evaluative dimension of subjective welfare assessments.

3.2 Methodology

Econometric model We are interested in the determinants of the categorical subjective poverty variable *subjpov*. An ordinal interpretation of this variable is warranted, as there is little ambiguity between the categories; cardinality on the other hand may be to strong an assumption : it would require that the distance between two adjacent categories is constant (e.g., that the distance in terms of subjective poverty between "very poor" and "rather poor" is the same as between "well-off" and "rich"). Several papers have shown that, in the case of subjective-well being, especially in the case of the evaluative dimension captured by the Cantrill ladder, imposing a cardinality assumption has no real bearings on the sign, significance or magnitude of the estimates (Ferrer-i Carbonell and Frijters, 2004).

We are not ready to make this cardinality assumption, and thus have to rely on non-linear models based on maximum likelihood (ordinal logit or probit). This will become a problem when attempting to control for time-unvarying unobservables in a panel setting due to the incidental parameters problem (Hensher et al., 2005). Yet estimates based on ordinal models with a random effect specification may be subject to "frame of reference bias" (Bertrand and Mullainathan, 2001; Beegle et al., 2012), the fact that subjective scales may be subject to unobserved heterogeneity coming from the fact that verbal expressions such as 'rich' and 'poor' may mean different things to different people. This bias can in principle be neutralized by using respondent fixed effects. In order to perform this, we rely on a dichotomization

of our respondent variable, which allows us to estimate linear probability models with household-level fixed effects.

The justification for the random effect ordered logit model is the assumption that poverty perception is a latent variable, denoted S^*, which depends on household characteristics collected in the vector X, a factor δ_h representing unobserved household effect and an error term ϵ_{ht}:

$$S^*_{ht} = \beta X_{ht} + \delta_h + \epsilon_{ht} \tag{1}$$

The latent variable is supplemented by an observational rule such that $S = 1$ (*very poor*) whenever $S^* \leq \mu_1$, $S = 2$ (*somewhat poor*) when $\mu_1 < S^* \leq \mu_2$, $S = 3$ (*middle class*) when $\mu_2 < S^* \leq \mu_3$, and $S = 3$ (*well-off or rich*) when $S^* > \mu_3$. The unobserved effect δ_h is assumed to be uncorrelated with the variables in X, and normally distributed with mean zero and variance σ^2_δ. The error term ϵ_{ht} follows a logistic distribution with mean zero and unitary variance, leading to the ordered logit model. Under this model, the 3 threshold parameters μ_i ($i = 1, 2, 3$) are estimated jointly with the parameters β.

In order not to let our results hinge on the random effect assumption (the assumption that household-level unobserved factors are uncorrelated with our explanatory variables), we dichotomize the ordered variable as follow : $Z = 0$ when S is *very poor* or *poor*, and $Z = 1$ otherwise. We then estimate the following linear probability model with fixed effects:

$$Z_{ht} = \beta X_{ht} + a_h + \omega_{ht} \tag{2}$$

Where the error term ω is assumed normally distributed with mean zero and variance σ^2_ω; the individual heterogeneity term a_h is removed through the within transformation. Throughout or estimates, standard errors are clustered at the community (village/neighbourhood) level.

Own income and relative income Our main variables of interest are total log household income, Y, and relative income Y^{rel}. We compute relative income on a geographical basis, as the (log) median income of households in the same geographical entity (the income of the household under consideration being omitted). To account for the possibility of different comparison mechanisms according to the geographical scale of reference, we compute this median income at the level of the neighborhood or village (cluster level) as well as at the level of the province, a mid-level geographical entity. All monetary variables are deflated according to the official CPI, which takes into account price differences between urban and rural residents.

Control variables We add controls for the following characteristics of the household head: age, age squared, education level, and marital status. The household structure is controlled for by the number of children, youth, working-age and elderly living in the household, as well as the total number of women. Health status of the household is captured by the number of members who declare having been ill from chronic or temporary illness in the past 4 weeks. We proxy for social capital with two indicator variables, the first taking the value of one if any member of the household has participated in community-level activities in the previous year (neighborhood groups, mutual assistance in kind for

family or neighbors, charity work), the second taking the value of one if any household member is part of any kind of collective organization such as unions, producer cooperatives, political party, NGO, or youth movement. On top of income, we capture household wealth through an index constructed by principal component analysis on the durable goods, appliances and housing characteristics. Finally, we proxy income expectations by the answer to the Minimum Income Question (MIQ): "How much does a household like yours need per month in order not to be considered as poor".

4 Descriptive statistics

The distribution of perceived poverty is shown in table 1, disaggregated between urban and rural areas. We regroup the two highest modalities ("well-off" and "rich") due to the small number of households who chose these answers. Overall, 48% of households define themselves as either "very poor" (15.46%) or "poor" (32.74%). This proportion is higher in rural areas, at 57% of the households, than in urban areas (42% of households). In total, 47.25% of households consider themselves to be middle class (39% in rural areas and 53% in urban areas), while 4.5% of households sampled perceiving themselves as being well-off or rich.

Table 1: Subjective poverty by residency (all years)

	rural	urban	Total
very poor	20.04	12.29	15.46
rather poor	36.86	29.89	32.74
middle class	39.35	52.73	47.25
well-off/rich	3.75	5.09	4.54
Total	100.00	100.00	100.00
	(9 086)	(13 113)	(22 199)

Column percentages, frequencies in parentheses

As displayed in table 2, the distribution of subjective poverty is fairly stable over time. There is a small decrease of the proportion of households perceiving themselves as "very poor"(from 15.9% in 2012 to 14.5% in 2015), accompanied by a slightly bigger increase in the number of "rather poor" households (from 31.2% in 2012 to 34.9% in 2015). From an initial proportion of 6.2%, the proportion of "well-off" households decreases to 3.5% in 2015 (this is possibily a reflection of the common phenomenon of richer households dropping from the sample at a higher rate than the overall population).

This stability of the distribution of perceived poverty at the aggregate level doesn't give any information of the movements between different categories of perceived poverty at the household level. Tables 3 and 4 display the transition probabilities between different categories of subjective poverty, for pairs of consecutive panel waves (2012 to 2013 and 2013 to 2015).

For both pair of years, the overall mobility is strikingly high, as evidenced by the fact that for all categories except "middle class", there are more household who change category between two waves than who stay in the same category. This is partly a statistical artefact due to households at the extreme categories (when you're at the bottom, there is nowhere to go but up), but remains true for the people

Table 2: Subjective poverty by year (national)

	2012	2013	2015	Total
very poor	15.93	15.85	14.54	15.46
rather poor	31.15	32.46	34.85	32.74
middle class	46.77	47.87	47.13	47.25
well-off/rich	6.15	3.83	3.48	4.54
Total	100.00	100.00	100.00	100.00
	(7 853)	(7 370)	(6 976)	(22 199)

percentages, frequencies in parentheses

considering themselves as "poor" from 2012 to 2013. In general, the probability of staying in your present category of perceived poverty never exceeds 50% (except for "middle class" households), and it is quite common that perceived poverty moves of more than one increment between two consecutive waves. For instance, 25.3% of those who considered themselves as "very poor" in 2013 see themselves as "middle class" in 2014; and 14.5% of the "well-off" from 2013 revert to "poor" in 2015.

Table 3: Transition between subjective poverty status, 2012-2013

2012 \ 2013	very poor	poor	middle class	well-off
very poor	0.342	0.387	0.264	0.007
poor	0.185	0.391	0.410	0.013
middle class	0.081	0.273	0.597	0.049
well-off	0.122	0.205	0.498	0.175

Table 4: Transition between subjective poverty status, 2013-2015

	very poor	poor	middle class	well-off
very poor	0.313	0.417	0.253	0.017
poor	0.170	0.419	0.398	0.013
middle class	0.081	0.293	0.582	0.045
well-off	0.043	0.145	0.631	0.180

One possible interpretation of these large movements in the perceived poverty status is that it comes from measurement error: the more the household answer to this question with "noise", the more movement we will witness between categories in consecutive years. To verify this, we examine the other caracteristics of the households' living standards, as related to their perceived poverty status.

Figure 1 represents the distribution of subjective poverty by another indicator of living standards, quintiles of consumption per person (total household consumption divided by the number of persons living in the household). The proportion of households who consider themselves "very poor" or "poor" decreases monotonically with the consumption quintile, while the proportion of households who see themselves as "middle class" or "well-off" increases with consumption (the link is clearer in urban areas, due to the fact that the spread in consumption is lower in rural areas, and thus the quintile are less far apart from each other). The link between consumption per capita and perceived poverty goes beyond the mean, as shown by figure 2 in the annex, which displays stochastic dominance of each category of subjective poverty over the preceding one, in terms of consumption per person.

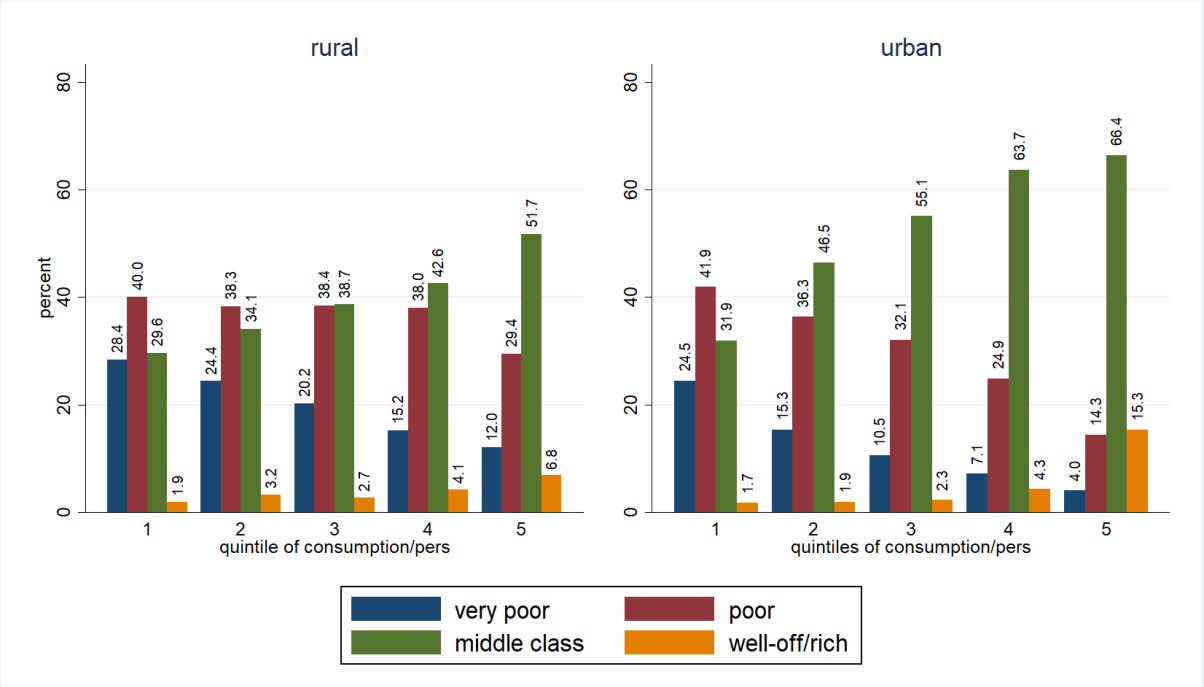

Figure 1: Subjective poverty by consumption quintile

Nor is the correlation of subjective poverty with standards of living restricted to consumption, as shown in table 5. Poorer households in terms have lower incomes, higher food shares, lower employment rates (despite having less inactive members in absolute numbers). The schooling ratio of children is lower, and the head has a higher chance of habing no education or to have stopped at the primary level.

5 Results

5.1 baseline results and comparison income

Table 6 presents our baseline specification. Columns 1 to 3 display the results of a panel ordinal logit specification with random effects, taking the ordinal variable *subjpov* (4 categories, 3 cutpoints) as a dependent variable. Column 4 to 6 present the results of linear probability model with fixed effects, where we have dichotomized the subjective poverty variable as follows: the categories "very poor" and "rather poor" have been recoded as zero, the other categories as one (i.e. "middle class" and "well-off/rich". The dichotomization allows us to control for unobserved, time-unvarying household factors that affect poverty perceptions, but it reduces the amount of total variation and thus the statistical power of our estimates. The coefficient of the LPM/FE specification can be directly interpreted as marginal effects on the probability of perceiving one's status as nonpoor. The coefficient for the ordinal logit models are not directly interpretable, but thanks to the "single crossing" property of ordinal models, we can interpret the sign and the significance (Hensher et al., 2005).

In both specification, we control for time and region fixed effects (results omitted in the table). Control for household head characteristics, household composition, health, community participation and living

Table 5: household characteristics by perceived poverty status

	very poor	rather poor	middle class	well-off/rich	Total
household size	5.610	5.871	5.933	6.189	5.872
	(1.961)	(2.178)	(2.238)	(2.636)	(2.197)
head education: none	0.669	0.592	0.434	0.428	0.524
	(0.471)	(0.492)	(0.496)	(0.495)	(0.499)
head education: primary	0.233	0.250	0.228	0.151	0.233
	(0.423)	(0.433)	(0.419)	(0.358)	(0.423)
head education: lower secondary	0.0607	0.0847	0.110	0.0813	0.0925
	(0.239)	(0.278)	(0.313)	(0.274)	(0.290)
head education: upper secondary	0.0271	0.0503	0.119	0.108	0.0809
	(0.162)	(0.219)	(0.323)	(0.310)	(0.273)
head education: higer ed.	0.0106	0.0226	0.110	0.232	0.0694
	(0.102)	(0.149)	(0.312)	(0.423)	(0.254)
age of hh head	48.45	50.12	51.01	53.52	50.41
	(11.01)	(11.29)	(11.08)	(11.92)	(11.23)
# of employed in hh	1.145	1.320	1.365	1.543	1.323
	(0.784)	(0.872)	(0.889)	(0.982)	(0.876)
# of elderly (>65yo)	0.178	0.219	0.229	0.335	0.222
	(0.448)	(0.502)	(0.510)	(0.594)	(0.503)
school enrollment rate	0.860	0.892	0.928	0.936	0.905
	(0.297)	(0.266)	(0.228)	(0.214)	(0.253)
employment rate	0.389	0.409	0.405	0.443	0.405
	(0.242)	(0.220)	(0.221)	(0.237)	(0.225)
# inactive	1.873	1.988	2.148	2.129	2.050
	(1.240)	(1.255)	(1.340)	(1.376)	(1.302)
log hh income	9.674	10.10	10.64	11.05	10.32
	(0.742)	(0.692)	(0.761)	(1.173)	(0.849)
log expenditure/pers.	8.962	9.161	9.505	9.850	9.318
	(0.521)	(0.518)	(0.628)	(0.862)	(0.633)
food share	46.05	44.29	40.01	36.84	42.28
	(14.38)	(14.00)	(14.23)	(15.72)	(14.48)

mean coefficients; sd in parentheses

standards, as described in part 3.2 are included. We systematically run the regressions at the national level (columns 1 and 4), and then stratify for rural (columns 2 and 5) and urban areas (columns 3 and 6), given the stark differences in standards of living that exists between these areas.

Table 6: perceived poverty : baseline results

	ologit-RE			LPM-fe		
	(1) total	(2) rural	(3) urban	(4) total	(5) rural	(6) urban
female hh head (0/1)	-0.00227	-0.110	0.0824	0.0323	0.0757	-0.00393
age of hh head	-0.0218*	-0.0236	-0.0328**	-0.00663	-0.0282**	0.000577
square age of hh head	0.000298***	0.000262*	0.000439***	0.0000479	0.000210*	-0.00000381
marital status (b. single):						
- married	0.176	0.433*	0.127	0.107	0.347**	0.0464
- widowed	-0.130	0.211	-0.271	0.118	0.359**	0.0637
- divorced and others	-0.0597	0.213	-0.176	0.0611	0.0385	0.0568
hh head education (b. none)						
- primary	0.0986*	0.0382	0.132*	0.0429	-0.183*	0.106
- lower secondary	0.374***	0.291**	0.374***	-0.100	-0.181	-0.0866
- upper secondary	0.413***	0.432**	0.349***	0.0748	0.0195	0.0674
- higher ed.	0.529***	0.231	0.444***	-0.106	-0.123	-0.113
# children (<6 y)	-0.0139	0.00442	-0.0518	-0.00450	-0.0127	0.00576
# women	-0.0165	-0.0129	-0.0141	0.00500	0.00935	0.00701
# youth (6-15 y)	-0.0391	-0.0446	-0.0549	-0.0390**	-0.0462	-0.0356
# working-age (16-65 y)	-0.0993***	-0.0344	-0.173***	-0.0138	-0.0123	-0.0182
# elderly (>65 y)	-0.0162	0.161**	-0.244***	-0.0674**	-0.0238	-0.101***
urban (0/1)	-1.468***	ref.	ref.	-0.400***	ref.	ref.
# of chronically ill	-0.126***	-0.0523	-0.149***	-0.00450	0.0171	-0.0214
# temporary ill	-0.0273	-0.0620	0.00444	-0.00739	-0.0521*	0.0102
community participation (0/1)	-0.0983*	0.00318	-0.118	0.00687	-0.0118	0.0220
member in coll. org (0/1)	-0.0293	0.244*	-0.224**	0.0132	0.0988**	-0.0271
benfitted from INDH	0.237***	0.400***	0.0815	0.0109	0.124***	-0.0556*
total hh revenue (ln)	0.966***	0.815***	1.074***	0.122***	0.104***	0.136***
durable and housing index	0.981***	0.673***	1.462***	0.115***	0.0888***	0.145***
MIQ (ln)	0.206***	0.204**	0.111	0.00273	0.0212	-0.0182
Constant				-0.261	0.0308	-0.735
cut1	8.068***	6.933***	9.609***			
cut2	10.39***	9.151***	12.07***			
cut3	14.65***	12.60***	16.99***			
sigma2_u	0.0953	2.36e-30	0.127			
region	Yes	Yes	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes	Yes	Yes
N	10058	3738	6320	10058	3738	6320
vce	cluster	cluster	cluster	cluster	cluster	cluster

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

For the most part, estimates conform with intuition and with the result of previous studies on SWB in developing countries (Senik, 2004; Knight and Gunatilaka, 2010). There is a U-shaped relationship between age and subjective poverty, as evidenced by the negative sign on the coefficient attached to *age* and the positive coefficient attached to age squared. Being married is associated with a positive coefficient on subjective poverty, although this effect is only significant in rural areas. This might reflect reverse causality, as better-off people are more likely to get married due to the specifics of the marriage market in Morocco.

A higher education of the household head is associated with higher perceived richness (lower subjective poverty). Note that the coefficients are not significant in the LPM/fixed effects specification, probably

due to the fact that for most households, education of the head is a fixed characteristic and does not change over the period under consideration. Household composition has no noticeable significant effect on subjective poverty, except for the number of working age adults, which has a negative and significant coefficient in the ordinal logit specification (but the significance disappears in the LPM/FE specification), and the number of elderly people, whose coefficient is negative in urban areas and positive one rural areas (only the urban result remains significant in the LPM/FE specification).

The number of chronically ill household members is associated with a lower subjective richness (not significant in LPM/FE), while the number of temporary ill members is not significant. Participation in collective activities at the neighborhood/village level has no significant effect on subjective poverty at conventional significance levels, while membership in any kind of collective organization (union, cooperative, political party, NGO) is associated with higher SWB in rural areas, and lower SWB in urban areas (the coefficient is not statistically significant in the LPM/FE specification). Finally, living standards variables (revenue and asset index) have generally, and predictably, a positive and significant association with perceived richness. The Minimum Income Question (MIQ), which can be interpreted as capturing income expectations, has a positive and significant coefficient in the ordinal logit specification with random effects at the national and rural level, but the significance disappears in the LPM/FE specification, which may indicate a co-determination of income expectations with subjective perception of poverty (Stutzer, 2004).

One interesting aspect is that, when controlling for living standards, the dummy variable *urban* is significant with a negative sign in both specifications. All else being equal, a given household would "feel poorer" living in urban areas, compared to rural areas. This might reflect differences in price levels. This argument is weakened by the fact that all economic variables (income, consumption and MIQ) are adjusted for pairs CPI differentials between urban and rural areas (as well as between different years). This might also reflect the fact that in urban areas, one is more likely to be surrounded by richer people, and thus may experience negative comparison. It is to the examination of possible comparison effects that we now turn.

Relative income Table 7 presents the results of baseline subjective poverty regressions, with "relative income" added. As previously, we present side to side the results for the panel ordinal logit model with random effects decomposition of the error term (columns 1 to 3) and of the linear probability model with fixed effects on the dichotomized variable (column 4 to 6). The controls are omitted from the table for ease of reading.

Our measure of comparison income is the median total household income in the geographical unit surrounding the household, the household's own income being omitted. We use the sample design to compute such a comparison income at two different geographical levels: first, at the sample cluster level, which typically constitutes a neighborhood (in urban areas) or a rural village; second, at the level of the *province*, a mid-level geographical entity[5]. We investigate the effect of income relative to cluster/province mean on subjective well being by entering both variable successively (columns 1, 2 3 and 4), and then simultaneously (column 3 and 6) in our subjective poverty equations.

[5] median province size is 371 000 inhabitants (76 700 households), divided between urban and rural areas.

Table 7: Relative income effects on perceived poverty, overall

	ologit-RE			LPM-fe		
	(1) subjpov b/se	(2) subjpov b/se	(3) subjpov b/se	(4) povsubj2 b/se	(5) povsubj2 b/se	(6) povsubj2 b/se
total hh revenue (ln)	0.951***	0.986***	0.959***	0.121***	0.123***	0.122***
	(0.040)	(0.040)	(0.040)	(0.014)	(0.014)	(0.014)
durable and housing index	0.957***	1.013***	0.967***	0.114***	0.117***	0.117***
	(0.046)	(0.045)	(0.046)	(0.019)	(0.019)	(0.019)
MIQ (ln)	0.202***	0.203***	0.191***	0.00282	0.00242	0.00246
	(0.052)	(0.051)	(0.051)	(0.017)	(0.017)	(0.017)
cluster median (log) income	0.123**		0.329***	0.0114		0.0306
	(0.057)		(0.064)	(0.029)		(0.036)
province median (log) income		-0.442***	-0.702***		-0.0252	-0.0502
		(0.093)	(0.106)		(0.039)	(0.048)
Constant				-0.371	-0.0182	-0.0722
				(0.480)	(0.539)	(0.544)
cut1	9.163	3.679	4.046			
cut2	11.48	5.996	6.359			
cut3	15.75	10.26	10.63			
sigma2_u	0.0929	0.0764	0.0640			
region	Yes	Yes	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes	Yes	Yes
N	10057	10055	10054	10057	10055	10054
vce	cluster	cluster	cluster	cluster	cluster	cluster

At the national level, the relative income of the area in which the household lives has different effects according to the geographical reference scale. Median cluster income is positively associated with subjective richness, while the province median income has a negative and significant coefficient. Both effect remain of the same sign and significant when entered simultaneously in the ordinal logit regression (column 3), but all relative income variables lose significance in the LPM/FE specification.

We run the same regressions segmented between rural and urban areas. The results of the full specification (with relative income both at the cluster and at the province level) are presented in table 8. We notice that the signs, magnitude and significance of relative income differ between urban and rural areas. In rural areas (columns 1 and 2), relative income at the cluster level is positive and significant, while median province income is negative and significant, both in the ordinal logit and LPM/FE specification. The size of the effect is similar in magnitude to the coefficient on own household income (column 2): an increase in 10 % of median village income increases by 10% the probability of a household to feel 'non-poor', while an increase of 10% of median province income increases increases the probability of feeling 'poor' (or 'very poor') by 12%.

In urban areas (columns 3 and 4), results are less clear. While the coefficient on median income at the cluster level is positive in significant in the ordinal logit specification, its magnitude drops and it becomes insignificant in the LPM/FE specification. On the contrary, the coefficient of province median income is negative and insignificant in column 3 (ordinal logit) but becomes negative and significant in the LPM/FE specification.

These results are broadly consistent with recent papers by Kingdon and Knight (2007), Brodeur and Flèche (2017) and Ifcher et al. (2018) showing, in a developed country context (USA), that the direction of income comparisons depends on the geographical area: positive for close neighborhoods, negative

Table 8: comparison effects by urban/rural

	rural		urban	
	(1) ologit-RE b/se	(2) LPM-FE b/se	(3) ologit-RE b/se	(4) LPM-FE b/se
total hh revenue (ln)	1.086***	0.115***	1.381***	0.142***
	(0.050)	(0.014)	(0.051)	(0.013)
cluster median (log) income	0.245**	0.101**	0.831***	0.00779
	(0.113)	(0.039)	(0.085)	(0.018)
province median (log) income	-0.376***	-0.119**	-0.162	0.106***
	(0.146)	(0.047)	(0.139)	(0.039)
Constant		0.0649		-1.982***
		(0.465)		(0.500)
cut1	7.602		19.69	
cut2	9.812		22.10	
cut3	13.52		26.96	
sigma2_u	0.492		0.591	
region	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes
N	5732	5732	9740	9740
vce	cluster	cluster	cluster	cluster

at a more aggregate level. The current estimations, at least for rural areas, would tend to show that such income comparisons matter as well for the poverty perceptions in a developing country context. Nevertheless, there might be other channels than relative income comparisons through which median income in a neighborhood affects SWB or poverty perceptions.

5.2 channels: local public goods or social ties?

The "relative income" hypothesis holds that our subjective well-being depends in large part of our income relative to that of our peers (Clark et al., 2008). But there might be other channels through which average income, at different scales of aggregation, affect subjective well-being and/or poverty perceptions.

Fisrt, the coefficients on average incomes at the cluster/province level in the subjective poverty regressions might be due to confounders : unobserved variables at the same levels that are correlated with both poverty perception and average income. Two candidates for these kind of variables, as noted by Ifcher et al. (2018), are house prices and local public goods or amenities. Housing prices are expected to be positively correlated with average incomes in a particular location, and affect negatively the subjective well-being/poverty perception of its inhabitants. On the other hands, local amenities such as parks, school quality, number of healthcare professionals, etc. might be positively correlated to average incomes and subjective well-being.

In table 9, we test an extended specification of our subjective poverty regression in order to exclude the hypothesis that our results are driven by the presence of local public goods. More specifically, we use publicly available data[6] on the number and the location of schools (lower and upper secondary schools), health centers (rural dispensaries, generalist and specialist health centres), the number of hospital beds by

[6] from the website data.gov.ma

Table 9: Channels (1) : local public goods

	total		rural		urban	
	(1)	(2)	(3)	(4)	(5)	(6)
	ologit-RE	LPM-FE	ologit-RE	LPM-FE	est5	est6
	b/se	b/se	b/se	b/se	b/se	b/se
total hh revenue (ln)	1.237***	0.129***	1.078***	0.113***	1.380***	0.142***
	(0.036)	(0.009)	(0.051)	(0.014)	(0.051)	(0.013)
cluster median (log) income	0.675***	0.0291	0.215*	0.0970**	0.835***	0.00755
	(0.066)	(0.019)	(0.114)	(0.040)	(0.085)	(0.018)
province median (log) income	-0.499***	0.00642	-0.449***	-0.102**	-0.240*	0.100**
	(0.097)	(0.029)	(0.148)	(0.048)	(0.145)	(0.039)
middle schools (density)	5.507***	-2.338	7.787**	-3.084	9.559***	-5.037
	(1.841)	(3.220)	(3.305)	(6.208)	(3.309)	(8.241)
postal offices (density)	0.885	-1.009	1.198	9.305**	0.297	-2.540
	(0.657)	(1.382)	(0.902)	(3.859)	(1.069)	(1.966)
specialized health centres (density)	-3.443	5.859	-8.161	-55.38	6.090	29.23
	(8.715)	(21.929)	(13.794)	(51.354)	(11.603)	(27.319)
generalist hospitals (beds)	-0.000452	0.000414	-0.00397***	0.000190	0.000363	0.0000995
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)
specialist hospitals (beds)	0.000238	-0.0000925	0.00149***	-0.0150***	0.0000208	-0.000244
	(0.000)	(0.000)	(0.000)	(0.004)	(0.000)	(0.000)
Constant		-0.826**		0.145		-1.793***
		(0.397)		(0.538)		(0.618)
cut1	12.81		6.586		19.41	
cut2	15.12		8.798		21.82	
cut3	19.53		12.47		26.68	
sigma2_u	0.556		0.451		0.584	
region	Yes	Yes	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes	Yes	Yes
N	15307	15307	5594	5594	9713	9713
vce	cluster	cluster	cluster	cluster	cluster	cluster

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

type of hospital (generalist and specialist hospitals), and postal officles (as a proxy of general government services). We compute province-and milieu-specific (urban/rural) density measures for these indicators, in order to neutralize the effect of the number of inhabitants.

A number of these public goods variables have significant coefficients, especially in the ordinal logit with random effect specifications (column 1, 3 and 5). The density of middle schools is associated with a higher level of perceived richness, in rural as well as in urban areas. In rural areas, the number of beds in specialist hospitals is associated with higher levels of subjective richness, while the number generalist hospital beds has a negative association with the same variable. This may reflect the lower-level public hospitals have a bad reputation, and that patients may prefers, other things being equal, to seek care in specialist hospitals.

The sign and significance of the mean income at province and cluster level is, in general, unchanged by the inclusion of local public goods density variables. Compared to table 8, mean income at the cluster level has still a positive coefficient in rural areas and a positive or insignificant coefficient, according to specification, in urban areas. Mean income at the province level has a negative coefficient in rural areas, and an insignificant or positive sign in urban areas. This is suggestive evidence that differential density of public goods between poor and rich provinces or areas is not the driving force behind our results, although one could think of other such local amenities that are not captured in our data (e.g. quality of roads, sanitation, public lightning, or safety in public places).

Another possible explanation for the positive coefficient found on mean income of small comparison areas (i.e., cluster level mean income) is that it may reflect possibilities for risk-sharing at the level of small communities (Cox and Fafchamps, 2007; Kingdon and Knight, 2007). One way to test indirectly for this hypothesis is to interact the neighbours income with some measure of the intensity of social ties. The 'social insurance effect' should be stronger for individuals that have more intense social ties and/or a denser social network.

Table 10 presents a version of this exercise. In it, we interact the various 'reference income' variables with a dummy indicating whether at least one household member is enrolled in a collective organisation of any sort[7]. In the full specification (columns 3, 6, 9 and 12), the interaction between organization membership and median cluster income is insignificant, for rural as well as urban areas. In rural areas, the interaction with province median income is *negative*, although it is not significant in the LPM/FE specification. In urban areas, the same interaction is positive, but not significant, both in the ordinal logit and in the LPM/FE specification. Thus, we find little support for the alternative explanation that "comparison effects" act mainly through the channel of risk-sharing opportunities.

[7]The main effect of the *organization* variable, omitted in the table, is similar to table 6

Table 10: Channel (2) : informal insurance

	rural						urban					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	ologit-RE	ologit-RE	ologit-RE	LPM-FE	LPM-FE	LPM-FE	ologit-RE	ologit-RE	ologit-RE	LPM-FE	LPM-FE	LPM-FE
	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se
total hh revenue (ln)	1.077***	1.101***	1.088***	0.111***	0.119***	0.115***	1.381***	1.505***	1.381***	0.144***	0.142***	0.142***
	(0.050)	(0.050)	(0.051)	(0.014)	(0.014)	(0.014)	(0.051)	(0.050)	(0.051)	(0.013)	(0.013)	(0.013)
cluster median (log) income	0.0885		0.242**	0.0458*		0.101**	0.813***		0.849***	0.0315		0.00543
	(0.081)		(0.115)	(0.028)		(0.039)	(0.082)		(0.093)	(0.021)		(0.019)
orga*(cluster median income)	-0.853***		0.256	-0.174**		0.0245	-0.115		-0.131	0.0249		0.0167
	(0.318)		(0.563)	(0.081)		(0.156)	(0.161)		(0.178)	(0.032)		(0.036)
province median (log) income		-0.0724	-0.292*		-0.00903	-0.101**		0.476***	-0.171		0.103***	0.1000**
		(0.106)	(0.150)		(0.034)	(0.048)		(0.129)	(0.146)		(0.039)	(0.041)
orga*(province median income)		-1.402***	-1.678***		-0.266***	-0.296		-0.0379	0.0102		0.103	0.0865
		(0.357)	(0.651)		(0.097)	(0.188)		(0.371)	(0.411)		(0.085)	(0.095)
Constant				-0.549	-0.0706	-0.0926				-1.142***	-1.871***	-1.890***
				(0.420)	(0.467)	(0.470)				(0.393)	(0.506)	(0.509)
cut1	9.783	8.362	8.457				21.24	19.18	19.80			
cut2	11.99	10.58	10.67				23.64	21.60	22.21			
cut3	15.69	14.29	14.39				28.50	26.43	27.06			
sigma2_u	0.495	0.499	0.506				0.591	0.695	0.588			
region	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	5734	5732	5732	5734	5732	5732	9741	9741	9740	9741	9741	9740
vce	cluster	cluster	cluster	cluster	cluster	cluster	cluster	cluster	cluster	cluster	cluster	cluster

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5.3 Do household care about intra-household inequalities?

Studies on subjective well-being conducted in developing countries are located at the individual level. By contrast, papers on subjective poverty, as well as the computation of poverty lines (monetary or "multidimensional") are concerned with the household as the unit of analysis, without consideration for possible inequalities in repartition within the households. Traditional measures of poverty thus exclude the possibility that there might be poor individuals in nonpoor households, or nonpoor individuals in poor households (Brown et al., 2017; De Vreyer and Lambert, 2016). This modeling choice proceeds from necessity rather than choice, as data on intra-household repartition is rare and expensive to collect. In this section, we want to ask whether such choice is warranted or if it risks giving a wrong picture about the nature of poverty, based on the households perception of their poverty.

To do this, we follow Sahn and Younger (2009) and Molini et al. (2010) in using body mass index (BMI) as a simple welfare indicator. As noted by the aforementioned authors, anthropometric data has several advantages over consumption or income data in developing country context: it is easy to collect and is arguably less subject to measurement error; moreover, such measurement errors are likely to be normally distributed. Specifically, the BMI, defined as the ratio of weight (in kilograms) to the square of height (in meters), has also several advantages compared to other indicators. Contrary to calorie intake, BMI takes into account differing nutritional needs for differing categories of people; and in contrast to height, which reflects disproportionately nutritional status in the past, the BMI is quick to react to current changes in nutritional status. The main drawback of using BMI as a welfare indicator is that its relation to poverty may be non-linear, if for instance obsesity is linked with low living standards. However, as argued by McLaren (2007) or Wittenberg (2013), the link between socioeconomic status and obesity is likely to be positive in developing countries, allowing us to use BMI as a basic welfare indicator.

BMI is traditionally computed for adults aged 20 to 65. In order to allow for meaningful measures of intra-household nutrition inequality, we used the entire population from 5 to 79 years old. For children and teenagers aged 5 to 19, we used WHO growth tables to create z-scores of BMI for age. For the rest of the population, we normalized the BMI using the median and standard deviations of BMI in our sample by 10-year interval. Finally, we standardized the BMI measurement, abritrarily adjusting using the BMI of a 20 years old (nonpregnant and non-breastfeeding) woman as our reference.

Our measure of intra-household nutrition inequality is the standard deviation of (standardized) BMI at the household level. Standard deviation is not scale invariant, but we control separately for mean BMI in our subjective poverty regression, in order to separate analytically the effects of BMI level and BMI inequality on the perception of poverty.

Table 11 displays the results of our subjective poverty equation, when controlling for mean BMI at the household level as well as the standard deviation of (standardized) BMI of the household's members. As usual, controls are omitted from our table for the brevity of exposition, and standard errors are displayed in parentheses below the coefficients. The coefficient attached to household mean BMI is positive and significant, for all specifications, in urban as well as in rural areas. This reinforces our prior of using BMI as a welfare indicator. The negative coefficient on the standard deviation of member's BMI indicated that intra-household inequality is associated with higher level of subjective poverty. This result holds for

Table 11: Intra-household BMI inequality

	ologit-RE			LPM-fe		
	(1) total b/se	(2) rural b/se	(3) urban b/se	(4) total b/se	(5) rural b/se	(6) urban b/se
total hh revenue (ln)	1.326***	1.098***	1.518***	0.209***	0.121***	0.219***
	(0.038)	(0.051)	(0.056)	(0.007)	(0.014)	(0.011)
stand dev of stand. BMI	-0.0244**	-0.0308*	-0.0167	-0.00548**	-0.0104*	-0.00335
	(0.011)	(0.017)	(0.014)	(0.002)	(0.006)	(0.003)
mean stand. BMI	0.0609***	0.0768***	0.0473***	0.0148***	0.00785*	0.00964***
	(0.009)	(0.014)	(0.011)	(0.002)	(0.005)	(0.002)
Constant				-2.139***	-0.854*	-2.089***
				(0.096)	(0.479)	(0.136)
cut1	13.58	11.67	15.38			
cut2	15.94	13.91	17.86			
cut3	20.45	17.85	22.72			
sigma2_u	0.571	0.440	0.629			
region	Yes	Yes	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes	Yes	Yes
N	13200	5105	8095	13200	5105	8095
vce	cluster	cluster	cluster	cluster	cluster	cluster

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

the overall population as well as in rural areas; in urban areas, although still negative, BMI inequality is not significant at conventional thresholds.

To explore further the effects of intra-household nutrition inequality, table 13 in the appendix shows regression results where nutrition inequalities have been decomposed in the proportion of the adult population that is respectively obese, overweight, thin, and undernourished[8]. Obesity is associated with higher well-being, although the result is not significant in the urban area and in the LPM/FE specification. The proportion of overweight members is consistently associated with higher subjective well-being (significant at the 1% threshold in all specification except in rural areas in the LPM/FE specification). Thinness is negatively related to SWB, with the same significance pattern. The proportion of undernourished household members has a consistently negative sign, but the results are not significant, presumably reflecting the small proportion of undernourished people in the population. Overall, these results give the impression that the result on BMI inequality is not entirely driven by extreme observations (one obese member or one undernourished member in an otherwise 'normal' household), which could reflect health issues and not BMI inequality.

Overall, the results presented in this section paint a consistent picture of higher BMI being associated with higher levels of well being, and inequality in BMI at the household level being associated with subjective poverty, especially in the rural areas.

[8]These categories correspond to the following thresholds in BMI. (a) 'undernourished': $BMI < 16.5$ (b) 'thin':$16.5 \leq BMI < 18.5$ (c) 'overweight': $25 < BMI \leq 30$ and (c) 'obese': $BMI > 30$

6 Conclusion

Concerns about status and relative positions are not new in economics, dating as far back as Duesenberry and Veblen (Luttmer, 2005). Yet it is only relatively recently that data on happiness and subjective well-being has been exploited to explore the empirical relevance of such mechanisms. First-generation studies have put the accent on the phenomenon of 'relative income' as an explanation for the Easterlin paradox, with far-reaching policy implications regarding the desirability of economic growth and material progress. More recent studies have refined these finding, adding some nuances to the domain of their application, but without overturning completely the key insight that relative concern matter greatly for experienced utility.

From the perspective of development economics, the conclusions of this research program are somewhat problematic. First, it clashes with the received wisdom that "growth is good for the poor" (Dollar and Kraay, 2002). If wellbeing depends mostly on relative concerns, growth, even of the inclusive sort, may not be enough to improve the lot of the population past some thresholds. Second, a view according to which neighbors as systematically perceived as "negatives" is in contradiction with the literature on risk-sharing and social networks, which shows that individuals and households derive utility from the accomplishment of others (Cox and Fafchamps, 2007).

In this paper, we investigate whether comparison effects matter for the households perception of their economic status, using a panel data from Morocco. The Moroccan context is interesting for the examination of comparison effects, as it is a lower middle-income countries with important inequalities in standards of living between urban and rural, as well as between regions. It is also an interesting context because of the political dynamics of local protest movements, which are not necessarily linked to material grievances and poverty but rather to inequality and dignity concerns (Rachik, 2014).

We find that relative income matters, but depends on the geographical reference scale. Median income in the neighborhood or village is associated with a better appreciation of one's own economic situation; while a higher income at the provincial level is associated with an increased perception of poverty. Similar to the findings of Ifcher et al. (2018) in the US, it seems to be the case that local neighbors are perceived as positive, and provincial neighbors are perceived as negatives. The effects (positive and negative) are more marked for rural residents that for urban households. We show suggestive evidence that these results are not driven by local public goods, nor by social assistance and risk sharing, which strenghtens the case that these results are driven by other-regarding preferences (social comparison and altruism). We then move the discussion at an infra-household level, and show that intra-household BMI inequality is associated with an increased perception of poverty. One implication of this is that there are barriers to intra-household equality that lie beyond the control of the household. The precise nature of these barriers will have to be investigated in future research.

Directions for future research include a better characterization of respondent characteristics, as well as an exploration of possible heterogeneity by subgroups. One question that may prove fruitful is to what extent the caracterization of poverty perceptions that we have developed in this article change when consumption is considered, rather than income. Finally, the econometric models used in this paper (ordinal logit with random effect and linear probability model with fixed effects) can be considered as "polar

cases" regarding the assumptions necessary for convergence. While the random effects specification requires a strong assumption about orthogonality of unobservables, the LPM model gets rid of a significant proportion of the variation in subjective well-being. In the future, intermediate specifications such as a correlated random coefficients models may be estimated for more robustness of the results.

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Appendix

Table 12: between subjective poverty and income/expenditure

	rural	urban
log expenditure/pers.	0.220	0.380
log hh income	0.407	0.482

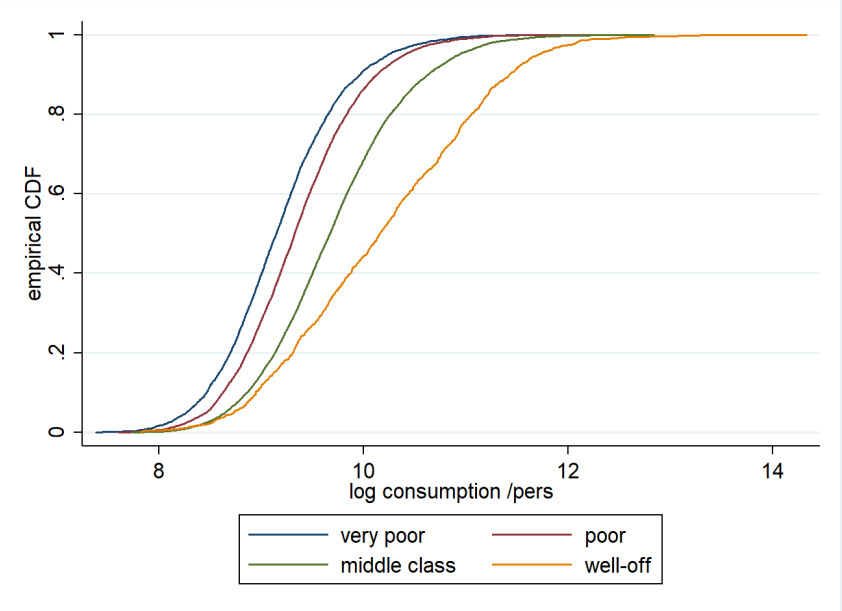

Figure 2: Empirical cumulative distribution of consumption per person, by subjective poverty

Table 13: nutrition and perceived poverty

	ologit-RE			LPM-fe		
	(1)	(2)	(3)	(4)	(5)	(6)
	total	rural	urban	total	rural	urban
malchron_	-0.131***	-0.0968**	-0.145***	-0.0237***	0.0000132	-0.0294***
	(0.0283)	(0.0482)	(0.0358)	(0.00553)	(0.0138)	(0.00680)
malpass_	-0.0788**	-0.0801	-0.0762	-0.0154**	0.00956	-0.0116
	(0.0381)	(0.0595)	(0.0510)	(0.00764)	(0.0168)	(0.00983)
collaction	-0.0751	-0.101	-0.0554	-0.00306	0.00568	0.0183
	(0.0472)	(0.0686)	(0.0667)	(0.00930)	(0.0206)	(0.0117)
exclusion	-0.544***	-0.483***	-0.579***	-0.0872***	-0.00659	-0.0948***
	(0.0584)	(0.0969)	(0.0755)	(0.0119)	(0.0304)	(0.0146)
orga	0.348***	0.572***	0.207**	0.0526***	0.0870***	0.0156
	(0.0684)	(0.117)	(0.0866)	(0.0127)	(0.0321)	(0.0146)
INDH	-0.634	-1.336**	-0.367	-0.142	-0.323***	-0.0688
	(0.482)	(0.668)	(0.626)	(0.106)	(0.0969)	(0.121)
benfitted from INDH	0.153**	0.250***	0.0476	0.0246**	0.0331	-0.00220
	(0.0655)	(0.0938)	(0.0909)	(0.0125)	(0.0271)	(0.0157)
lnRevenu_menconst	1.293***	1.053***	1.497***	0.205***	0.116***	0.215***
	(0.0348)	(0.0476)	(0.0500)	(0.00659)	(0.0132)	(0.00979)
propobese2060_	0.260***	0.601***	0.0859	0.0605***	-0.0184	0.0184
	(0.0939)	(0.169)	(0.117)	(0.0186)	(0.0609)	(0.0213)
propsurpoids2060_	0.389***	0.339***	0.407***	0.0745***	0.0319	0.0590***
	(0.0587)	(0.0942)	(0.0770)	(0.0116)	(0.0318)	(0.0139)
propmaigreur2060_	-1.035***	-1.099***	-0.905**	-0.166***	-0.0814	-0.142**
	(0.258)	(0.396)	(0.353)	(0.0494)	(0.104)	(0.0676)
propdenutrition2060_	-0.602	-0.166	-1.048	-0.118	0.176	-0.193
	(0.659)	(0.673)	(1.240)	(0.126)	(0.193)	(0.223)
Constant				-1.606***	0.149	.
				(0.133)	(0.421)	
cut1	11.02***	7.374***	13.87***			
	(0.637)	(0.899)	(0.859)			
cut2	13.34***	9.572***	16.31***			
	(0.642)	(0.905)	(0.868)			
cut3	17.73***	13.24***	21.17***			
	(0.658)	(0.922)	(0.895)			
sigma2_u	0.547***	0.388***	0.659***			
	(0.0607)	(0.0869)	(0.0837)			
region	Yes	Yes	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes	Yes	Yes
N	15325	5665	9660	15325	5665	9660
vce	cluster	cluster	cluster	cluster	cluster	cluster

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$