Household’s subjective well-being and environmental vulnerability: A comparative study on rural Thailand and Vietnam*

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Very preliminary & incomplete version

Abstract

This paper analyzes the determinants of the households’ welfare perception using a survey database on rural areas of Thailand and Vietnam. Analyses focus on the interpersonal comparison (via relative income or relative wealth) and the households’ self-assessment of general risk attitude as well as their vulnerability. Welfare perception corresponds to the households’ subjective assessment about their general situation. Attitudes towards risks correspond to the household readiness in case of economic and environmental shocks. Vulnerability encompasses not only the households’ economic circumstances but also their situation related to the natural and geographical environment. The analysis provides some guideline about policy implementation in presence of economic and environmental shocks on household’s well-being in Vietnam and Thailand.

Key words: environmental shocks; risks; subjective well-being; vulnerability

JEL classification: I31; O12; Q56

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1. Introduction

While standard economic theory assumes that individual utility is derived from the absolute level of consumption or income, numerous empirical investigations shed light on the phenomenon of relative standing (Frey and Stutzer, 2002, Frijters et al. 2004, Luttmer, 2005, Ferrer-i-Carbonelle, 2005, Clark et al. 2008, Fafchamps and Shilpi, 2008, Tsui, 2014, etc.). People derive satisfaction not only from their absolute position in terms of material conditions (consumption, income) but also from their relative position compared with their peers. Individuals have a tendency to compare their position to a reference, and the comparison behavior may be motivated by the desire to acquire a social status, which brings about social esteem, respect, admiration for individuals.

Empirical investigations underline that the relative income may matter differently following the groups of individuals. In particular, the rich might care more about the relative wealth than the poor. This asymmetry in individual preferences for relative income is shown for instance in Ravallion and Lokshin (2010). Using Malawian data, these authors found that the relative income has no effect on the poor’s subjective well-being. The same result is observed in Akay and Martinsson (2011) using the data of rural Ethiopia.

The asymmetry in comparison is also reflected by the differentiated effect of the reference level. Reference income affects differently the individual preferences following the fact that the individual’s income is higher or lower than the reference level (Ferrer-i-Carbonell, 2005, Tsui, 2014). The result of Ferrer-i-Carbonell (2005), using the data of German survey (GSOEP), shows that individuals compare their income with that of richer. This finding supports the Duesenberry (1949)’s idea that the comparison is upward. The poorer individuals compare their income to that of their richer peers, while the richer individuals do not get happier when their income is higher than that of their poorer peers. In the same vein, Tsui (2014) considers two different reference incomes for an individual: an average of other individuals’ income higher than his income and an average of other individuals’ income lower than his income. The result shows that an increase in the low average has a smaller effect on the subjective well-being than an increase in the high average.

It should be noticed that several papers in this literature focus only on the socio-economic aspect and ignores the concern on environmental quality or natural disasters. In the case of developing countries, households living conditions should be significantly affected by natural disasters and environmental vulnerability (Nguyen et al. 2015, Arouri et al. 2015). Disasters cause important losses in developing countries and the poor are likely the first victims of natural disasters (Ludwig et al. 2007). Rural and poor households are vulnerable to environmental shocks and suffer several consequences of natural disasters. Arouri et al. (2015) show that the natural disasters (storms, floods and droughts) have a negative effect on income and expenditure of rural households in Vietnam. Kurosaki (2014) investigate the household consumption response to natural disasters (floods and droughts) and health shocks using data from rural Pakistan. Results show that the consumption response differs across different types of households, in particular younger and more landed households are less vulnerable (in terms of a decline in consumption) to floods.
This paper fits in the literature of subjective well-being using the data from survey on rural households in Vietnam and Thailand, and focusing both on the impact of natural disasters and relative standing. Its goals are then double: first, this paper provides a test on the effect of relative income with a special attention on the asymmetric comparison hypothesis. Second, for the case of developing countries such as Vietnam and Thailand, the paper cares about some characteristics of the poor rural area such as environmental and economic vulnerability. It is about to analyze the nexus between households’ welfare perception, self-assessment of general risk attitude. Welfare perception corresponds to the households’ subjective assessment about their general situation. Attitudes towards risks correspond to the household readiness in case of economic and environmental shocks. Vulnerability encompasses not only the households’ economic circumstances but also their situation related to the natural and geographical environment.

Findings derived from the analyses of subjective well-being and its determinants have important policy implications, in particular for Vietnam and Thailand, two developing countries where income inequality is high compared to the developed countries. If only absolute income matters, public policy should focus on the reduction of absolute poverty. If both relative and absolute income affect individuals’ well-being, policy maker should pay attention on poverty and inequality reduction in order to improve the self-reported happiness of the population. Analyses on the effects of environmental shocks and natural disasters give some insights on environmental policies in both countries.

The remainder of the paper is organized as follows: Section 2 provides a survey on subjective well-being focusing on low income countries. Section 3 presents the data and some descriptive statistics. Econometric specification is presented in Section 4 and estimation results in Section 5. Section 6 concludes.

2. Subjective well-being and relative standing

Most studies in the literature on subjective well-being shed light on a phenomenon of relative standing, contrary to the absolute utility hypothesis, which is postulated in the standard economic modelling. However, the relative standing effects differ between developed and developing countries, as well as between rich and poor individuals in a same country with similar socio-economic circumstances. For the case of developed countries, there is a consensus that reference level exerts a negative effect on the individual subjective well-being or life satisfaction, which are considered as proxies of individual utility (Clark and Oswald, 1996, McBride, 2001, Frijters et al., 2004, Luttmer, 2005, Ferrer-i-Carbonell, 2005, Clark et al., 2008). For example, Luttmer (2005) uses the US data from the National Survey of Families and Households and considers the neighbors’ earnings as a reference to which individuals compare their earnings. This study provides evidence that the reference level has a negative impact on the individuals’ self-reported well-being. In particular, the magnitude of the effect on well-being of an increase in neighbors’ earnings and that of a decrease in own income are roughly similar.
It is noticed that the reference level may refer to an external reference (others) but also to an internal reference (one past income or expected future income) (Clark, 2000, Clark et al., 2008, Alvarez-Cuadrado et al. 2012). Alvarez-Cuadrado et al. (2012), using the Spanish Continuous Family Expenditure Survey, estimate the importance of the interdependence of preferences and habit persistence. Their results suggest that households’ preferences derive almost 25% of their consumption services from comparison between their consumption and that of their neighbors, and around 35% from comparison between their current and past consumption. This implies that around 60% of individual satisfaction is from relative consumption.

Contrary to a great number of studies using data in developed countries which underline a significant impact of relative income, a small number studies using data in developing and low income countries give a different conclusion. There is not systematically a meaningful effect of relative concern on the subjective well-being. Ravallion and Lokshin (2010), using Malawian data, found that the relative income has no effect on the poor’s subjective well-being. The same result is observed in Akay and Martinsson (2011) using the data of rural Ethiopia. These studies show only a significant effect of absolute income. For the rural areas of northern Ethiopia, one of the poorest regions in the world, relative income does not matter at all.

It should be noticed that within a country, relative income matter differently between the rich and the poor. The effect of relative standing on the well-being is meaningful for the rich while it is not meaningful for the poor. For the latter, the effect of absolute income is often more significant (Clark et al., 2008, Akay and Martinsson, 2011, Asadullah and Chaudhury, 2012). For example, Asadullah and Chaudhury (2012), using data from rural Bangladesh, show that relative wealth effect is stronger for the rich. However, when compared the relative wealth effect to the absolute wealth effect, the result shows that the relative wealth effect is lower. Focusing on the effect of relative consumption for the case of Nepal, Fafchamps and Shilpi (2008) give two different findings following the type of the poor. The authors confirm the fact that the poor care less about relative consumption than the non-poor. However, when focusing on the poor households who are isolated from markets, the conclusion changes. Households in isolated areas are more sensitive to the standards of living of their neighbors. Moreover, controlling for a migration variable, Fafchamps and Shilpi show that household heads having migrated out of their birth district continue to compare their consumption with that of households in their district of origin.

3. Data

The data used in this paper come from a rich survey database on “Impact of Shocks on the Vulnerability to Poverty: Consequences for Development of Emerging Southeast Asian Economies” in Vietnam and Thailand, collected by the DFG (German Research Foundation) FOR 756. The survey was conducted in 2007, 2008, and 2010.1 Our analysis covers the 2010

1 The area of the survey is illustrated in Figure A1.
wave. Table A1 in Appendix summarizes the definition of variables, concerning socio-demographic and economic conditions of the sampled households. Descriptive statistics are reported in Table A2 for the Vietnamese data and in Table A3 for the Thai data.

Two measures of household’s subjective well-being are available in the data. They are defined in comparison with either the year before the survey or the previous five-year period. To the questions “do you think your household is better off than last year?” and “do you think your household is better off than 5 years ago?”, households are asked to report their answer on a decreasing scale: 1 (much better off), 2 (better off), 3 (same as), 4 (worse off), and 5 (much worse of). Given that for both measures, categories 1 and 5 have very few observations, we then merge categories 1 and 2 into one group, and categories 4 and 5 into another group to create two new variables. Each of them is a three-categories variable. The first one is subjective well-being compared to the previous year: $SWB = 1$ if the household’s well-being is worse off or much worse off than the previous year, = 2 if it is the same as the previous year, = 3 if it is better off or much better off. The other variable, subjective well-being compared to the previous five years, $SWB_5$, is defined similarly. The final dataset obtained from the 2010 wave contains 1859 households (for both $SWB$ and $SWB_5$) from 199 villages in three Thai provinces (Buriram, Ubon Ratchathani, and Nakhon Phanom) and 1375 households (for $SWB$) and 1372 households (for $SWB_5$) observed from 152 villages in three Vietnamese provinces (Ha Tinh, Dak Lak, and Thua Thien-Hue). Table 1 reports the distribution of these two subjective variables for Thailand and Vietnam. We remark that when comparing to the previous 5 years, a majority of households in both groups think that their situation is better or much better off. However, comparing to the previous year, the most frequent answer is the same as (the previous year).

Table 1: Distribution of household subjective well-being

<table>
<thead>
<tr>
<th>Compared to the previous year ($SWB$)</th>
<th>Vietnam</th>
<th>Thailand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
</tr>
<tr>
<td>Much worse off or worse off ($SWB = 1$)</td>
<td>355</td>
<td>25.82</td>
</tr>
<tr>
<td>Same as ($SWB = 2$)</td>
<td>576</td>
<td>41.89</td>
</tr>
<tr>
<td>Better off or much better off ($SWB = 3$)</td>
<td>444</td>
<td>32.29</td>
</tr>
<tr>
<td>Compared to the previous 5 year ($SWB_5$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Much worse off or worse off ($SWB_5 = 1$)</td>
<td>278</td>
<td>20.26</td>
</tr>
<tr>
<td>Same as ($SWB_5 = 2$)</td>
<td>312</td>
<td>22.74</td>
</tr>
<tr>
<td>Better off or much better off ($SWB_5 = 3$)</td>
<td>782</td>
<td>57.00</td>
</tr>
</tbody>
</table>

Notes. Total number of observations: 1375 ($SWB$) and 1372 ($SWB_5$) for Vietnam, 1859 for Thailand.

Table 2 describes the distribution of self-assessment of household wealth, compared to the village and to the country. Households are asked to estimate whether their wealth is better off than that of their village and that of the country. Compared to the village, the most frequent answer is “the same as” other households with 66.29 % for Thai households and 48.25% for Vietnamese households. The most frequent answer regarding the comparison with the country
is more pessimistic as 58.98% of the sampled Vietnamese households and 49.33 of the sampled Thai households think that their wealth is much worse or worse off than that of other households.

Table 2: Distribution of household subjective wealth

<table>
<thead>
<tr>
<th></th>
<th>Vietnam</th>
<th></th>
<th>Thailand</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
<td>Frequency</td>
<td>Percent</td>
</tr>
<tr>
<td><strong>Compared to the village</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Much worse off or worse off</td>
<td>483</td>
<td>35.31</td>
<td>368</td>
<td>19.72</td>
</tr>
<tr>
<td>Same as</td>
<td>667</td>
<td>48.25</td>
<td>1237</td>
<td>66.29</td>
</tr>
<tr>
<td>Better off or much better off</td>
<td>225</td>
<td>16.45</td>
<td>261</td>
<td>13.99</td>
</tr>
<tr>
<td><strong>Compared to country</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Much worse off or worse off</td>
<td>811</td>
<td>58.98</td>
<td>917</td>
<td>49.33</td>
</tr>
<tr>
<td>Same as</td>
<td>461</td>
<td>33.53</td>
<td>787</td>
<td>42.33</td>
</tr>
<tr>
<td>Better off or much better off</td>
<td>103</td>
<td>7.49</td>
<td>155</td>
<td>8.34</td>
</tr>
</tbody>
</table>

Notes. Total number of observations: 1375 for Vietnam, 1859 for Thailand.

Variable regarding the risk attitude is also subjective and represents the self-assessment of general risk attitudes. People are asked to respond, on an 11-point Likert scale, to the question “Are you generally a person who is fully prepared to take risks (10) or do you try to avoid taking risks (0)?”.

Figure 1: Distribution of household total annual income, in thousands dollars, PPP.
Figure 1 displays the distribution of total household income. We observe that Thai households are slightly richer than Vietnamese counterparts as the Thai income distribution is on the right of the Vietnamese income distribution. Table A1 also describes other variables regarding the households’ characteristics (log house value, mean village income, household size, average age, share of male members, ethnic minority), living conditions (public water supply availability, access to facilities such as electricity, sanitation, internet, telephone, etc), village characteristics (such as mountain, slope, valley, lake, coast, dirt road) and province characteristics. We remark that ethnic minority is a dummy variable with 0 if household belongs to Kinh majority group and 1 if he belongs to an ethnic minority. Given that the majority of Vietnamese belong to Kinh ethnic (one of 54 ethnics) with around 85% of the total population, this variable contains a majority of 0.

4. Econometric specification
Let us consider the following household’s utility function:

\[ U_i = U(y_i, \bar{y}, w_i, \bar{w}, x_i), \]

where \( y_i \) is the household income, \( \bar{y} \) a reference income level used for comparison purpose (for example, the average income of the household \( i \)’s village, region or country), \( w_i \) the household wealth, \( \bar{w} \) a reference wealth (e.g. the average wealth of the household \( i \)’s village), and \( x_i \) the set of other observed determinants. The choice of this households’ utility function depending on the average level of wealth and average level of income refers to the comparison phenomenon concerning individual well-being (Clark and Oswald, 1996, Frey and Stutzer, 2002, Luttmer, 2005; Clark et al., 2008, Akay and Martisson, 2011, etc.). People derive satisfaction not only from their absolute position in terms of material conditions (consumption, income) but also from their relative position compared with their peers. In this specification, the average level of income \( \bar{y} \) and that of wealth \( \bar{w} \) are considered as reference levels to which households compare their absolute level. A negative impact of the reference level on the households’ well-being implies that there exists an interpersonal comparison. The higher the reference level, the lower the households’ utility, all other things remaining equal.

The household \( i \)’s well-being, noted as \( U_i^* \), is unobserved (or latent). It can be proxied by an observed subjective measure and augmented by an unobserved error term \( \varepsilon_i \). If we note \( U_i \) as the observed households’ responses concerning their well-being, we can specify the following ordered probit model:

\[ U_i^* = z_i' \beta + \varepsilon_i \]
\[ U_i = 1 \text{ if } U_i^* \leq c_1 \]
\[ = 2 \text{ if } c_1 < U_i^* \leq c_2 \]
\[ = 3 \text{ if } c_2 < U_i^* \]
where $U_i$ corresponds to the observed subjective well-being reported by household $i$ (either $SWB$ or $SWB5$), and $\varepsilon_i$ is assumed to be independent and identically distributed. In this specification, parameters to be estimated are $\beta$ (the intercept is normalized to zero) and the thresholds $c_1$ and $c_2$. The set of explanatory variables $z$ encompasses all the variables included in the arguments of the utility function, i.e. $y_i$, $\bar{y}$, $w_i$, $\bar{w}$, $x_i$. More precisely, they correspond to household total annual income, average household income at the village level, logarithm of the house value (if sold, which can be used as a proxy for household wealth), subjective household wealth compared to other village residents (or subjective household wealth compared to other country residents). The set $x_i$ includes control variables for household behavior facing risks, household size, average age in the household, share of male members, dummy for ethnic minority, dummy for public water supply availability, percentages to access to several facilities (electricity, public water supply, sanitation, public waste disposal, fixed line telephone, internet), dummies for geographical characteristics of household $i$’s village (on a mountain, on slope, in a valley, near a river, near a lake, on the coast, access limited to dirt roads), and dummies for provinces (provinces Dak Lak and Nakhon Phanom are used as the reference for the Vietnamese and Thai data, respectively).

Estimation of the model is performed by maximum likelihood using village-clustered robust standard errors. In this specification, household income can be endogenous as unobserved factors can determine this variable. In order to account for this endogeneity in the ordered probit model, we use the ‘variable addition test’ based on the control function approach proposed by Wooldridge (2014) to test for endogeneity of explanatory variables in nonlinear models. It can be implemented by using the following two-step procedure: First, we make a linear regression of household income on the whole set of the model’s explanatory variables and additional instruments (which are excluded from the model). The latter correspond to two measures about the health status of the household head (compared to the previous year and the last previous five years), a dummy indicating the household head suffering a serious disease, a dummy indicating the household head’s ability of reading and writing, two dummies for the main occupation of the household head (agriculture and non-agriculture, other activities being the reference category), and a dummy for membership of a political association (communist Party, professional association, etc). This step provides the estimated residuals $\hat{u}_i$. Second, we perform the usual ordered probit regression with $\hat{u}_i$ as an additional explanatory variable. This allows us to compute a (village clustered) robust Wald test for the null hypothesis that the coefficient of $\hat{u}_i$ is zero. The null hypothesis corresponds to the exogeneity of income. The test is called ‘robust’ because it is based on robust standard errors. In the context of our model, the test statistic corresponds to a chi-squared distribution of 1 degree of freedom.

5. Estimation results

The computed chi-squared statistic of the variable addition test for endogeneity of income is equal to 1.40 (for the model with $SWB$) and 0.01 (for $SWB5$) in the case of Vietnam and 0.88 ($SWB$) and 1.95 ($SWB5$) in the case of Thailand. This result indicates that the exogeneity of income is not rejected. Estimation results with exogenous income are reported in Table 3.
In both cases, Vietnam and Thailand, households’ income exerts a positive and significant effect on their subjective well-being while the average income at both the village and country level has no effect. This implies that there is no comparison phenomenon regarding the households’ income. This result corroborates with the main findings in different analyses using the data from low income countries (Ravallion and Lokshin, 2010), Akay and Martinsson, 2011, Asadullah and Chaudhury, 2012). Clearer observations should be found when we calculate the marginal effects of explanatory variables. Notice that the marginal effect of an explanatory variable is calculated by maintaining other variables at their average values. Tables 4 and 5 present the marginal effects of different explanatory variables for both subsamples, Vietnam and Thailand. We observe that income has a negative effect on the probabilities to give a low level of well-being (SWB = 1 or = 2) while it has a positive effect on the probability to give a high level of well-being (SWB = 3) corresponding to the response following that household think that comparing to the previous year or to the 5 previous year, their well-being is better or much better off. This observation regarding the marginal effect is compatible with a positive effect of income on households’ well-being, as presented in Table 3.

Nevertheless, observations differ regarding the subjective self-assessment of household wealth. Results reported in Table 3 indicate that if households in both sub-samples estimate that their wealth better off than that of other country residents, they would feel happier. Table 4 supports this result as a higher subjective wealth increases the probability of giving a high value of subjective well-being (SWB = 3) and decreases that of giving a low value of subjective well-being (SWB = 1, SWB = 2), all things remain unchanged.

Apart from the similarity in income and subjective wealth effects between Vietnam and Thailand households, there is a divergence in the impact of other explanatory variables. Let us consider risk attitude. This variable has no effect on the Thai subjective well-being while it exerts a positive effect on the Vietnam subjective well-being. For the case of Vietnam, households proceeding to preventive actions and preparing to take risk think that their well-being is better or much better off than the previous year or the 5 previous years. Regarding the living conditions, happiness of Vietnamese households in a village is increasing with the proportion of village’s households having access to electricity. Other living conditions such as access to public water supply, to sanitation, to internet, etc. have no impact on both Thailand and Vietnam households’ well-being.

Another divergence is observed regarding the geographic conditions. While people living in mountain or in village with dirt road are happier for the case of Vietnam, they are less happy for the case of Thailand.

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2 Notice that marginal effects of a variable on different probabilities, $\frac{\partial P(U_i = l)}{\partial z_{ij}}$ where $l = 1, 2, 3$, sum up to 0, i.e. $\sum_{l=1}^{3} \frac{\partial P(U_i = l)}{\partial z_{ij}} = 0$. 

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Table 3: Estimation results.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Vietnam</th>
<th>Thailand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SWB</td>
<td>SWB5</td>
</tr>
<tr>
<td>Income</td>
<td>0.016***</td>
<td>0.005</td>
</tr>
<tr>
<td>Mean village income</td>
<td>-0.003</td>
<td>0.011</td>
</tr>
<tr>
<td>Log house value</td>
<td>-0.036</td>
<td>0.032</td>
</tr>
<tr>
<td>Subjective wealth, wrt village</td>
<td>-0.022</td>
<td>0.060</td>
</tr>
<tr>
<td>Subjective wealth, wrt country</td>
<td>0.144**</td>
<td>0.067</td>
</tr>
<tr>
<td>Risk attitude</td>
<td>0.106***</td>
<td>0.012</td>
</tr>
<tr>
<td>Household size</td>
<td>-0.015</td>
<td>0.018</td>
</tr>
<tr>
<td>Average age</td>
<td>0.001</td>
<td>0.003</td>
</tr>
<tr>
<td>Share of male members</td>
<td>0.265</td>
<td>0.161</td>
</tr>
<tr>
<td>Ethnic minority</td>
<td>0.153</td>
<td>0.098</td>
</tr>
<tr>
<td>Public water supply availability</td>
<td>0.042</td>
<td>0.147</td>
</tr>
<tr>
<td>Access to electricity</td>
<td>0.004**</td>
<td>0.002</td>
</tr>
<tr>
<td>Access to public water supply</td>
<td>-0.002</td>
<td>0.002</td>
</tr>
<tr>
<td>Access to sanitation</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>Access to public waste disposal</td>
<td>-0.001</td>
<td>0.002</td>
</tr>
<tr>
<td>Access to fixed line telephone</td>
<td>-0.001</td>
<td>0.002</td>
</tr>
<tr>
<td>Access to internet</td>
<td>0.011</td>
<td>0.009</td>
</tr>
<tr>
<td>Mountain</td>
<td>0.130*</td>
<td>0.074</td>
</tr>
<tr>
<td>Slope</td>
<td>-0.065</td>
<td>0.090</td>
</tr>
<tr>
<td>Valley</td>
<td>0.092</td>
<td>0.127</td>
</tr>
<tr>
<td>River</td>
<td>0.051</td>
<td>0.098</td>
</tr>
<tr>
<td>Lake</td>
<td>0.000</td>
<td>0.086</td>
</tr>
<tr>
<td>Coast</td>
<td>-0.151</td>
<td>0.118</td>
</tr>
<tr>
<td>Dirt road</td>
<td>0.026</td>
<td>0.155</td>
</tr>
<tr>
<td>Ha Tinh province</td>
<td>0.386**</td>
<td>0.161</td>
</tr>
<tr>
<td>Thua Thien – Hue province</td>
<td>0.091</td>
<td>0.199</td>
</tr>
<tr>
<td>Buriram province</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Ubon Ratchathan province</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>$c_1$</td>
<td>0.354</td>
<td>0.419</td>
</tr>
<tr>
<td>$c_2$</td>
<td>1.555***</td>
<td>0.419</td>
</tr>
<tr>
<td>Log-likelihood</td>
<td>-1395.449</td>
<td>-1248.327</td>
</tr>
<tr>
<td># observations</td>
<td>1375</td>
<td>1372</td>
</tr>
</tbody>
</table>

Notes. Estimations based on ordered probit regression with village-clustered robust standard errors. Dependent variable: subjective well-being compared to previous year (SWB) and to previous five years (SWB5). Significant level: *** 1%, ** 5%, * 10%.
<table>
<thead>
<tr>
<th>Variable</th>
<th>$P(SWB = 1)$</th>
<th>$P(SWB = 2)$</th>
<th>$P(SWB = 3)$</th>
<th>$P(SWB5 = 1)$</th>
<th>$P(SWB5 = 2)$</th>
<th>$P(SWB5 = 3)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td>-0.005***</td>
<td>-0.005**</td>
<td>0.005***</td>
<td>-0.008***</td>
<td>-0.003***</td>
<td>0.012***</td>
</tr>
<tr>
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<td>0.0000</td>
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<td>-0.012</td>
<td>-0.008</td>
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<td>Subjective wealth, wrt village</td>
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<td>-0.007</td>
<td>-0.003</td>
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<tr>
<td>Subjective wealth, wrt country</td>
<td>-0.043**</td>
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<td>0.048**</td>
<td>-0.010</td>
<td>-0.004</td>
<td>0.014</td>
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<tr>
<td>Risk attitude</td>
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<td>-0.003***</td>
<td>0.035***</td>
<td>-0.027***</td>
<td>-0.011***</td>
<td>0.038***</td>
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<td>Average age</td>
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<td>-0.0001</td>
<td>0.0005</td>
<td>-0.001</td>
<td>-0.0004</td>
<td>0.001</td>
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<tr>
<td>Share of male members</td>
<td>-0.079</td>
<td>-0.008</td>
<td>0.088*</td>
<td>-0.024</td>
<td>-0.009</td>
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<tr>
<td>Ethnic minority</td>
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<td>-0.005</td>
<td>0.051</td>
<td>0.050**</td>
<td>0.019*</td>
<td>-0.069**</td>
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<td>Public water supply availability</td>
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<td>-0.001</td>
<td>0.014</td>
<td>-0.011</td>
<td>-0.004</td>
<td>0.015</td>
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<tr>
<td>Access to electricity</td>
<td>-0.001***</td>
<td>-0.0001*</td>
<td>0.001***</td>
<td>-0.002***</td>
<td>-0.001***</td>
<td>0.003***</td>
</tr>
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<td>0.0001</td>
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<td>0.001</td>
<td>0.0003</td>
<td>-0.001</td>
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<td>Access to sanitation</td>
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<td>-0.0000</td>
<td>0.0002</td>
<td>-0.0002</td>
<td>-0.0001</td>
<td>0.0003</td>
</tr>
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<td>Access to public waste disposal</td>
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<td>0.0000</td>
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<td>0.0005</td>
<td>0.0002</td>
<td>-0.001</td>
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<td>Access to fixed line telephone</td>
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<td>0.0003</td>
<td>-0.001</td>
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<td>Access to internet</td>
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<td>-0.0003</td>
<td>0.004</td>
<td>-0.001</td>
<td>-0.0004</td>
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<td>Mountain</td>
<td>-0.039*</td>
<td>-0.004</td>
<td>0.043*</td>
<td>-0.047**</td>
<td>-0.018**</td>
<td>0.065**</td>
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<td>0.010</td>
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<td>0.004</td>
<td>0.001</td>
<td>-0.005</td>
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<td>0.023</td>
<td>0.009</td>
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<td>0.005</td>
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<td>Dirt road</td>
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<td>-0.001</td>
<td>0.008</td>
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<td>-0.023*</td>
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Notes. Estimations based on ordered probit regression. Dependent variable: subjective well-being compared to previous year ($SWB$) and to previous five years ($SWB5$). Standard errors, obtained by delta method, are in parentheses. Significant level: *** 1%, ** 5%, * 10%.
Table 4: Marginal effects, Thailand

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<th>Variable</th>
<th>$P(SWB = 1)$</th>
<th>$P(SWB = 2)$</th>
<th>$P(SWB = 3)$</th>
<th>$P(SWB5 = 1)$</th>
<th>$P(SWB5 = 2)$</th>
<th>$P(SWB5 = 3)$</th>
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<td>-0.001***</td>
<td>0.003***</td>
<td>-0.002***</td>
<td>-0.001***</td>
<td>0.003***</td>
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<tr>
<td>Mean village income</td>
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<td>0.001</td>
<td>0.0005</td>
<td>-0.002</td>
</tr>
<tr>
<td>Log house value</td>
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<td>-0.003</td>
<td>0.009</td>
<td>-0.009</td>
<td>-0.003</td>
<td>0.012</td>
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<tr>
<td>Subjective wealth, wrt village</td>
<td>0.0001</td>
<td>0.0001</td>
<td>-0.0002</td>
<td>-0.018</td>
<td>-0.006</td>
<td>0.024</td>
</tr>
<tr>
<td>Subjective wealth, wrt country</td>
<td>-0.042***</td>
<td>-0.017***</td>
<td>0.059***</td>
<td>-0.038***</td>
<td>-0.014***</td>
<td>0.052***</td>
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<td>-0.005</td>
<td>-0.001</td>
<td>0.004</td>
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<td>-0.01</td>
<td>-0.0005</td>
<td>0.002</td>
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<td>Average age</td>
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<td>0.001</td>
<td>-0.001</td>
<td>-0.0005</td>
<td>0.002</td>
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<tr>
<td>Share of male members</td>
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<td>-0.003</td>
<td>0.010</td>
<td>0.040</td>
<td>0.014</td>
<td>-0.054</td>
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<td>-0.357</td>
<td>0.198</td>
<td>0.071</td>
<td>-0.269</td>
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<tr>
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<td>0.033</td>
<td>0.013</td>
<td>-0.047</td>
<td>0.052*</td>
<td>0.019*</td>
<td>-0.071*</td>
</tr>
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<td>0.001</td>
<td>0.0003</td>
<td>-0.001</td>
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<tr>
<td>Access to public water supply</td>
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<td>0.0000</td>
<td>-0.0001</td>
<td>0.0002</td>
<td>0.0001</td>
<td>-0.0003</td>
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<td>Access to sanitation</td>
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<td>-0.000</td>
<td>0.0001</td>
<td>-0.003</td>
<td>-0.0001</td>
<td>0.0003</td>
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<td>Access to public waste disposal</td>
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<td>-0.000</td>
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<td>-0.000</td>
<td>-0.0001</td>
<td>0.0001</td>
</tr>
<tr>
<td>Access to fixed line telephone</td>
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<td>0.0001</td>
<td>-0.000</td>
<td>-0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Access to internet</td>
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<td>0.0002</td>
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<td>-0.0001</td>
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<tr>
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<td>0.160***</td>
<td>0.057***</td>
<td>-0.217***</td>
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<td>-0.049</td>
<td>-0.006</td>
<td>-0.002</td>
<td>0.007</td>
</tr>
<tr>
<td>Valley</td>
<td>0.081***</td>
<td>0.033***</td>
<td>-0.113***</td>
<td>0.113***</td>
<td>0.040***</td>
<td>-0.153***</td>
</tr>
<tr>
<td>River</td>
<td>-0.040*</td>
<td>-0.016*</td>
<td>0.056*</td>
<td>-0.023</td>
<td>-0.008</td>
<td>0.031</td>
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<tr>
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<td>-0.0003</td>
<td>0.001</td>
<td>-0.004</td>
<td>-0.001</td>
<td>0.005</td>
</tr>
<tr>
<td>Buriram province</td>
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<td>0.017*</td>
<td>-0.059*</td>
<td>0.065**</td>
<td>0.023**</td>
<td>-0.089**</td>
</tr>
<tr>
<td>Ubon Ratchathani province</td>
<td>-0.045*</td>
<td>-0.018*</td>
<td>0.063</td>
<td>-0.021</td>
<td>-0.007</td>
<td>0.028</td>
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</table>

Notes. Estimations based on ordered probit regression. Dependent variable: subjective well-being compared to previous year ($SWB$) and to previous five years ($SWB5$). Standard errors, obtained by delta method, are in parentheses. Significant level: *** 1%, ** 5%, * 10%.
6. Conclusion

To be completed

References


Appendix

Figure A1: Area of survey. Source: Hardeweg (2009) based on ESRI World Map.
### Table A1: Definition of variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(SWB)</strong></td>
<td>Household subjective well-being, compared to previous year (=1 if much worse/worse off, 2 same as, 3 if much better/better off)</td>
<td>Discrete</td>
</tr>
<tr>
<td><strong>(SWB_5)</strong></td>
<td>Household subjective well-being, compared to previous 5 year (=1 if much worse/worse off, 2 same as, 3 if much better/better off)</td>
<td>Discrete</td>
</tr>
<tr>
<td>Income</td>
<td>Household income, in thousands dollars, PPP</td>
<td>Continuous</td>
</tr>
<tr>
<td>Mean village income</td>
<td>Mean household income, computed at the village level</td>
<td>Continuous</td>
</tr>
<tr>
<td>Log house value</td>
<td>Logarithm of house value if sold</td>
<td>Continuous</td>
</tr>
<tr>
<td>Subjective wealth, wrt village</td>
<td>Subjective wealth, compared to other village residents (=1 if much worse/worse off, 2 same as, 3 if much better/better off)</td>
<td>Discrete</td>
</tr>
<tr>
<td>Subjective wealth, wrt country</td>
<td>Subjective wealth, compared to other country residents (=1 if much worse/worse off, 2 same as, 3 if much better/better off)</td>
<td>Discrete</td>
</tr>
<tr>
<td>Risk attitude</td>
<td>Self-assessment of general risk attitude (=1 if unwilling to take risks, ..., 10 if fully prepared to take risks)</td>
<td>Discrete</td>
</tr>
<tr>
<td>Household size</td>
<td>Number of household members</td>
<td>Discrete</td>
</tr>
<tr>
<td>Average age</td>
<td>Average age of household members</td>
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</tr>
<tr>
<td>Share of male members</td>
<td>Share of male members in household size</td>
<td>Continuous</td>
</tr>
<tr>
<td>Ethnic minority</td>
<td>Belonging to an ethnic minority (=1 if belonging to an ethnic minority, 0 if belonging to Kinh majority group)</td>
<td>Dummy</td>
</tr>
<tr>
<td>Public water supply availability</td>
<td>Availability of public water supply (=1 if available, 0 otherwise)</td>
<td>Dummy</td>
</tr>
<tr>
<td>Access to electricity</td>
<td>Percentage of village households having access to electricity</td>
<td>Continuous</td>
</tr>
<tr>
<td>Access to public water supply</td>
<td>Percentage of village households having access to public water supply</td>
<td>Continuous</td>
</tr>
<tr>
<td>Access to sanitation</td>
<td>Percentage of village households having access to sanitation</td>
<td>Continuous</td>
</tr>
<tr>
<td>Access to public waste disposal</td>
<td>Percentage of village households having access to public waste disposal</td>
<td>Continuous</td>
</tr>
<tr>
<td>Access to fixed line telephone</td>
<td>Percentage of village households having a fixed line telephone</td>
<td>Continuous</td>
</tr>
<tr>
<td>Access to internet</td>
<td>Percentage of village households having access to internet</td>
<td>Continuous</td>
</tr>
<tr>
<td><strong>Village characteristics</strong></td>
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<td></td>
</tr>
<tr>
<td>Mountain</td>
<td>=1 if located on a mountain, 0 otherwise</td>
<td>Dummy</td>
</tr>
<tr>
<td>Slope</td>
<td>=1 if located on slope, 0 otherwise</td>
<td>Dummy</td>
</tr>
<tr>
<td>Valley</td>
<td>=1 if located in a valley, 0 otherwise</td>
<td>Dummy</td>
</tr>
<tr>
<td>River</td>
<td>=1 if located near a river, 0 otherwise</td>
<td>Dummy</td>
</tr>
<tr>
<td>Lake</td>
<td>=1 if located near a lake, 0 otherwise</td>
<td>Dummy</td>
</tr>
<tr>
<td>Coast</td>
<td>=1 if located near the coast, 0 otherwise</td>
<td>Dummy</td>
</tr>
<tr>
<td>Dirt road</td>
<td>=1 if access to the village is limited to dirt roads, 0 otherwise</td>
<td>Dummy</td>
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<tr>
<td><strong>Provinces</strong></td>
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<td></td>
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<td>Ha Tinh</td>
<td>=1 if belonging to the province, 0 otherwise</td>
<td>Dummy</td>
</tr>
<tr>
<td>Thua Thien – Hue</td>
<td>=1 if belonging to the province, 0 otherwise</td>
<td>Dummy</td>
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<td>Dak Lak</td>
<td>=1 if belonging to the province, 0 otherwise</td>
<td>Dummy</td>
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<tr>
<td>Buriram</td>
<td>=1 if belonging to the province, 0 otherwise</td>
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<td>Ubon Ratchathani</td>
<td>=1 if belonging to the province, 0 otherwise</td>
<td>Dummy</td>
</tr>
<tr>
<td>Nakhon Phanom</td>
<td>=1 if belonging to the province, 0 otherwise</td>
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Table A1: Descriptive statistics, Vietnam

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<th>Variable</th>
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<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
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Tableau A2: Descriptive statistics, Thailand

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<th>Variable</th>
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<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
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<td><strong>SWB</strong></td>
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