

# Remittances and Relative Concerns in Rural China\*

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## Abstract

The paper investigates the impact of remittances on the relative concerns of households in rural China. Using the Rural to Urban Migration in China (RUMiC) dataset we estimate a series of subjective well-being functions to simultaneously explore relative concerns with respect to income and remittances. Our results show that although rural households experience substantial welfare loss due to income comparisons, they gain well-being by comparing their remittances with those received by their reference group. In other words, we find evidence of a “status effect” with respect to income and of a “signal effect” of similar magnitude with respect to remittances. This finding is robust to various specifications, alternative reference group definitions, controls for the endogeneity of remittances and selective migration, as well as the use of migrants’ net contribution to household income.

**Key Words:** *positional concerns; remittances; subjective well-being*

**JEL Classification:** C90, D63

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## 1. Introduction

For the past three decades China has been experiencing an enormous movement of workers from rural towards urban areas. Recent estimates show that about 155 million people have left their rural residence to work in urban areas (Cai et al., 2011). Due to *hukou* restrictions, migrants' spouses and children are often left behind in villages, making remittances a crucial source of income to "compensate" for the migrant's absence.<sup>1</sup> Estimates suggest that migrants sent about US \$30 billion to rural areas in 2005 (Gong et al., 2008). Such large cash flows have important and complex effects not only on the welfare of family members left behind, but also on the development, income distribution and welfare of rural villages (e.g., Acosta et al., 2008; Howell, 2014). This paper investigates how remittances affect the relative (or positional) concerns of rural households using subjective well-being (SWB hereafter) as a proxy for the experienced utility (Kahneman et al., 1997; Kahneman and Sugden, 2005).

An emerging strand of the literature has put forward the idea that individual subjective welfare does not only depend on the absolute level of income but also on relative concerns, that is, on how individuals compare their income with that of other relevant people (Clark et al., 2008; Senik, 2008). The effect of relative concerns has been analyzed using SWB data from existing surveys (e.g., Ferrer-i-Carbonell, 2005; Clark et al., 2008) or by collecting experimental data (e.g., Solnick and Hemenway, 1998; Carlsson et al., 2007; Akay et al., 2011).<sup>2</sup> Both approaches suggest that the relative income substantially affects individuals' welfare. In the non-experimental approach, the role of relative concerns is captured by introducing the average income of individuals in the relevant reference group as an additional control variable in SWB regressions conditional on individuals' absolute income and other characteristics. Evidence from developed countries suggests that the reference group's mean income negatively affects well-being. Such a result is compatible with the presence of a status effect reflecting feelings such as envy (Luttmer, 2005; Clark et al., 2008).

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<sup>1</sup> *Hukou* is China's household registration system. Migrants from rural areas possess a rural hukou and they are typically unable to obtain an urban hukou. However, they are allowed to reside in a city as long as they are employed and can remain up to six months after unemployment.

<sup>2</sup> The second approach to investigate the positional concerns is based on tailored survey experiments constructed to explicitly identify the relative concerns. This method allows for identifying positional concerns both for income and consumption of specific goods, such as cars and holidays (see, e.g., Solnick and Hemenway, 1998, 2007; Alpizar et al., 2005; Carlsson et al., 2007; Akay et al., 2011, 2013).

Yet, empirical studies from less developed or transition countries report small, sometimes positive impact from relative concerns (see for South Africa: Kingdon and Knight, 2007; Bookwalter and Dalenberg, 2010; Ethiopia: Akay and Martinsson, 2011; Akay et al., 2011; China: Appleton and Song, 2008; Knight et al., 2009; Knight and Gunatilaka, 2010; Akay et al., 2012; Poland: Senik, 2005, 2008; Russia: Senik 2004; Ravallion and Lokshin, 2000).<sup>3</sup> One possible explanation of the positive effect is the presence of altruistic feelings towards other members with which the individual interacts, e.g., in the local community. Another explanation is that the incomes of other people act like a *signal effect* (or a “demonstration effect” or “tunnel effect” as coined by Hirschman and Rothschild, 1973) for the individual’s own income potential and prospects, thus resulting in positive feelings (Senik, 2005).

By investigating the effect of the remittances received by those in the reference group (*relative remittances*) on individuals’ SWB, we build upon and bring together the literature strands on relative concerns and remittances. The remittances literature focuses mainly on the absolute effect of remittances on well-being, particularly in relation to income inequality and poverty (see e.g., Acosta et al., 2008; Akay et al., 2014). Remittances are expected to be positively associated with the well-being of individuals left behind since they represent an additional (or substitutive) income source. In addition, however, remittances may change the income distribution and the relative income position of households within the village. That is, remittances might change the reference group’s income position, thereby triggering a “status” or a “signal” effect to the extent that individuals might also be concerned with the remittances received by other households.

Our analysis, based on the Rural to Urban Migration in China (RUMiC) dataset, provides novel and striking results on rural households’ relative concerns with respect to both rural income and remittances. The first result is that the definition of income matters when identifying relative concerns in a regression framework. A measure of the overall household income alone might not be able to identify the true effect. Second, we show that while a status effect among rural households exists, the magnitude and significance of the estimated effect depends on the model specification. Third, by decomposing the overall household income into the part

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<sup>3</sup> See also the comprehensive survey by Clark and Senik (2010).

pertaining to remittances and the part pertaining to activities carried out in the village (henceforth: rural income), we find that rural households experience both status and signal effects at the same time. In particular, households exhibit a strong status effect with respect to rural income and an equally strong signal effect with respect to remittances. This result suggests that these two effects may be neglected when analyzing relative concerns using aggregate income measures. Fourth, results are very stable across heterogeneous groups and overall insensitive to the definition of the reference group. Last but not least, we take into account the role of selectivity into migration by both estimating selection equations and calculating the counterfactual income and expenditure distributions pertaining to migrants.

The paper is organized as follows: Section 2 provides information about the data and descriptive statistics. Section 3 outlines the econometric approach. Section 4 and 5 report the results from our baseline and additional models, respectively. Section 6 concludes.

## **2. Data**

### **2.1. The RUMiC Dataset**

We employ data from the Longitudinal Survey on Rural to Urban Migration in China (RUMiC), which consists of three distinct surveys: the Urban Household Survey (UHS), the Rural Household Survey (RHS), and the Migrant Household Survey (MHS).<sup>4</sup> Our paper is based on the first wave of the RHS. Data were collected at the beginning of 2008, with most information (e.g., migration, income) referring to 2007.<sup>5</sup> The RHS covers the 9 largest migrant sending provinces of China (Anhui, Chongqing, Guangdong, Hebei, Henan, Hubei, Jiangsu, Sichuan, and Zhejiang), and 82 counties (counties are the administrative level above villages and below provinces), as depicted in Figure 2. The survey was conducted using random samples from the household income and expenditure surveys carried out in rural villages by the National Bureau of Statistics of China, thus constituting a representative sample for these provinces.

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<sup>4</sup> For an extensive description of RUMiC, see Akgüç et al. (2014).

<sup>5</sup> The global economic crisis has affected both migration and return decisions. At the end of 2008, around 23 million migrants returned to their rural villages (National Bureau of Statistics of China, 2010). Hence, the data used in our paper refer to a time period before the crisis. However, we have also checked the robustness of our results by using the waves collected in 2009 and 2010.

Figure 1 about here

The dataset has rich information about demographic and socio-economic characteristics of household members, including questions on physical and mental health, life events, and social networks. We supplement the main dataset with two ancillary modules collected in parallel to RUMiC: the *income-expenditure household* module, which contains information on income, remittances, assets, consumption and expenditure at the household level, and the *rural community survey*, which includes village-level information such as economic conditions, migration in and out of the village, and public expenditure. A village cadre is usually interviewed about these. Below we describe in detail the key variables used in the analysis. Appendix A reports summary statistics of all selected variables.

## 2.2. Measures of Well-being

The literature has identified several measures to proxy SWB (Frey and Stutzer, 2002; Dolan et al., 2008). These are generally based on survey questions about “happiness,” “life-satisfaction” or “mental health.” In order to measure SWB, we constructed an index based on the 12 mental health questions contained in the RUMiC’s General Health Questionnaire (GHQ-12).<sup>6</sup> Information on GHQ-12 is available for all individuals aged 16 and above who are present at the time of the survey.<sup>7</sup> The use of the GHQ-12 index has been widely accepted (see e.g., Clark and Oswald, 1994, 2002; Akay et al., 2012, 2013, 2014), which is highly correlated with other SWB measures. Each question allows responses with scores between 0 (high levels) and 3 (low levels). To obtain the GHQ-12 index, we sum up the scores of the 12 questions, obtaining an index ranging from 0 to 36. We then reverse the scale so that 0 indicates the lowest SWB and 36 the highest level. One advantage of using an index that aggregates the 12 questions instead of using each question is that one has more variability in the SWB measure. In order to check the robustness of our results, in unreported analysis, we have also constructed a “happiness” index by using only the

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<sup>6</sup> Our well-being index is based on summing each question in the General Health Questionnaire (GHQ-12). See Appendix B for the GHQ-12 questionnaire details and Goldberg (1978) for an introduction to the questions and use of the GHQ. However, as discussed in Hankins (2008), this approach would be problematic if the variances of the individual responses were different, in particular between positively and negatively phrased questions. Fortunately, we do not find significant differences in our sample.

<sup>7</sup> Importantly, this means that SWB is not available for current migrants, an issue that receives specific attention in our robustness analysis.

twelfth question of the GHQ: “How happy are you when you consider each aspect of your life?” The correlation between the happiness question and the remaining questions within the GHQ-12 questionnaire is 0.50, which is consistent with the aforementioned literature. We have also used the happiness variable as a proxy for individual heterogeneity in SWB regressions based on the GHQ, as further explained in Section 5.1.

The distribution of our GHQ index resembles that of other SWB studies (see, e.g., Winkelmann and Winkelmann, 1998). The distribution of the index is left-skewed, with few people reporting very low levels of SWB. In Figure 1, we split the distribution into households who receive remittances and those who do not. The figure suggests no systematic difference in terms of SWB between the two groups.

Figure 1 (a and b) about here

### 2.3. Sample and Descriptive Statistics

The sample consists of individuals aged between 16 and 70 who report SWB information. We cover a total of 11,624 individuals across 6,063 households.

*Migrants.* One of the key variables is individuals’ migration status. This is constructed using the question, “How many months did you live away from the local township in 2007?” combined with an ancillary question on where the person lived during his or her absence (“If you lived outside the local township for more than three months in 2007, where did you live mainly?”). A migrant is defined as someone who lived in urban areas for at least six months during 2007. A household might have more than one migrant and the migrant can be the head, spouse, or another household member. Given this definition, our data show that 39% of households have at least one migrant. Note that although the SWB information is missing for individuals who currently live in the city, the survey respondent reports all socio-demographic and economic information for absent household members. We also construct an indicator of whether individuals have migrated in the past (i.e., before 2007).

*Rural Income and Remittances.* The other two key variables for this study are the households’ overall income components: rural income and the remittances sent by migrants who live in the city. The rural income pertains to a mix of different activities

conducted in the village including wage employment, self-employment, and farming. We have detailed information about the various income sources, which we use in the analysis. Remittances are proxied by a variable capturing the household income from working in activities conducted outside the village. Income and remittances are measured at the household level in thousands of Chinese Yuan (CNY). While we explore different definitions, our preferred measure for rural income and remittances is the logarithm of equalized income using the modified OECD scale (the deflator is 1 for the household head, 0.5 for non-migrant adults and 0.3 for each child).

*Key statistics.* In Table 1 we report descriptive statistics of SWB, along with various income and remittances definitions (see Appendix A for the statistics of additional variables). We show statistics for the whole sample as well as separately for households who receive and do not receive remittances. The average SWB level is 28.08 (on our 0–36 scale). The difference between remittance receivers and non-receivers is very small, albeit statistically significant (28.27 versus 27.86 respectively,  $p$ -value=0.000). The mean level of remittances among receivers is 8,471 CNY, which constitutes more than a third of total income for these households. Average total income for these households is 24,990 CYN, compared to 26,785 CYN for households without remittances. However, the income difference between these two groups is not meaningful since household sizes differ systematically due to absent members who migrated. If we equalize incomes using the current household size, per capita incomes of the two groups become rather similar: 17,845 CYN for households receiving remittances versus 17,727 CYN for households without remittances.

Table 1 about here

### **3. Empirical Approach**

#### **3.1. Model Specification**

We estimate a series of alternative SWB regressions. In addition to the absolute income level and other characteristics, the standard approach in the literature identifies relative concerns using the average income of individuals in the reference group as a control variable (e.g., Ferrer-i-Carbonell, 2005; Akay et al., 2012, 2013). Here we decompose this relative income in two components: the relative rural income

and the relative remittances. Hence, our specification includes measures for absolute ( $Y_i$ ) and relative rural income ( $Y_i^r$ ) and absolute ( $R_i$ ) and relative remittances ( $R_i^r$ ), where  $r$  is the reference group. Accordingly, the baseline model reads as follows:

$$SWB_i^* = \alpha_1 \log(Y_i) + \rho_1 \log(Y_j^r) + \alpha_2 \log(R_i) + \rho_2 \log(R_j^r) + \mathbf{x}_i' \boldsymbol{\beta} + \eta_k + \varepsilon_i \quad (1)$$

In Equation (1) the dependent variable SWB is considered to be latent for each individual  $i$ , suggesting that the appropriate model would be an ordered probit. However, previous studies show no appreciable difference between estimating SWB models with linear or latent dependent variable specification (Ferrer-i-Carbonell and Frijters, 2004). Hence, in line with the bulk of the SWB literature, we estimate our models using OLS and only check the sensitivity of the results using ordered probit at the end. The estimates of parameters  $\alpha_1$  and  $\alpha_2$  are expected to be non-negative since higher levels of income and remittances imply more consumption possibilities and possibly higher SWB, other things being equal. However, the “marginal utility” of rural income and remittances might differ. We carry out extensive sensitivity checks surrounding the estimation of  $\alpha_1$  and  $\alpha_2$ .

The key parameters to our analysis are  $\rho_1$  and  $\rho_2$ , which capture the relative rural income and relative remittance effects, respectively. The corresponding variables are defined as follows:

$$Y_j^r = \frac{1}{N_j} \sum_{s=1}^{N_j} Y_s \quad (2)$$

$$R_j^r = \frac{1}{N_j} \sum_{s=1}^{N_j} R_s \quad (3)$$

where  $N_j$  is the number of individuals within the reference group  $j$  (e.g., a county). The signs of  $\rho_1$  and  $\rho_2$  are not obvious a priori. Either rural income or remittances of the reference group could be negatively correlated with SWB, reflecting the presence of envy or jealousy. As described in the introduction, we refer to this situation as the *status effect* with respect to a particular type of income. On the contrary, a positive coefficient would indicate a *signal effect*, reflecting an individual’s own income potential and prospects. Indeed, the relative income and remittances could have different signs, implying a status effect for one variable and a signal effect for the

other. Equation (1) also includes controls for socio-demographic characteristics ( $x$ ) such as age, sex, marital status, and health status; the term  $\eta$  refers to indicators for provinces. The standard errors are clustered at the household level, though the analysis also explores other clustering criteria. The model presented in Equation (1–3) might be subject to potential selection issues. One potential issue could be that preferences towards status might influence the incentives to migrate. We investigate this and other potential biases in Section 5.

### 3.2. Measuring Reference Groups

One of the crucial issues is how to define the reference group. While reference groups are usually unknown, the literature suggests two distinct approaches to identify groups to which individuals refer. The first method suggests using ad-hoc criteria to define the groups based on socio-demographic similarities (e.g., Clark and Oswald, 1996; McBride, 2001; Ferrer-i-Carbonell, 2005; Luttmer, 2005). The second method directly asks people to whom they compare themselves. The difference between these two approaches has been found to be minimal (Clark and Senik, 2010).<sup>8</sup>

In a survey among rural households in China, Knight et al. (2009) explicitly ask rural households about their reference groups. About 70% of the respondents report that they compare their income with that of village members. Our dataset includes an identifier for the village where the household is located. Thus it would be optimal to use village residents as the reference group. However, the sample size is not large enough to construct a relative income variable that is precise enough: on average, only 10 households are sampled in each village. Instead, we refer to a slightly larger orbit of comparison and use 82 Chinese “counties,” as defined in the data section.

While the county identifies the baseline reference group, we also define narrower reference groups by combining additional dimensions of comparison, such as similarity in household migration characteristics (i.e., the reference group is households within the same county who have migrants) or similarity in employment status (i.e., the reference group is wage workers within the same county). We will

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<sup>8</sup> The past achievement of an individual can be considered as one of the other reference income point (e.g., Stutzer, 2004). The literature uses these reference groups to identify income aspirations and adaptations. In this paper we focus on the relative concerns with respect to the remittances or income of similar people in the reference groups in order to directly identify the relative concerns.

explore the sensitivity of our results to the reference group definition.

#### **4. Results**

As a preliminary step, we show SWB determinants in rural China. Then, we outline results for relative concerns with respect to total household income and disentangle the components to study the role of relative remittances versus rural income. Finally, we investigate the role of income inequality and observed heterogeneity, and check the sensitivity of results to alternative reference groups. We reserve the next section of the analysis for migration selectivity and additional robustness checks.

##### **4.1. Determinants of Subjective Well-Being in Rural China**

In Table 2 we present the results of a standard OLS regression of SWB, where we include individual socio-demographic and economic controls as well as variables related to the household, including household members' migration status. The scope of this regression is to show how our estimates compare with those of existing SWB studies. We present results for the whole sample as well as separately for households receiving and not receiving remittances. The signs, magnitudes, and statistical significance of the estimates pertaining to socio-economic and demographic characteristics align with other studies (e.g., Dolan et al., 2008; Knight et al., 2009; Akay et al., 2012). The pattern of results is also similar across households who receive remittances and those who do not, albeit there are differences in the magnitude and sometimes the sign of some estimated parameters. Below, we briefly discuss and interpret the benchmark results.

*Rural Income and Remittances.* In the first panel of Table 2, we include the two components of household income (rural income and remittances), indicators for economic activity, and other wealth measures. As one would expect, rural income is positively correlated with SWB. The magnitude of this correlation is similar across specifications and is usually statistically significant, with the exception of the specification related to household members in the remittance-receiving group. Such positive correlation is consistent with the results for developed countries (e.g., Dolan et al., 2008) and also with previous evidence from China (Knight et al., 2009; Knight and Gunatilaka, 2010; Akay et al., 2012).

While we thoroughly investigate the role of remittances later on, we can already notice that remittances positively correlate with SWB, with estimates that are statistically significant in all specifications. Furthermore, the magnitude of the “*marginal utility of remittances*” is close to the “*marginal utility of rural income*.” In fact, the difference between the two estimates is not statistically significant (0.210 versus 0.175, p-value=0.7 for the whole sample).

Our regressions include additional economic and wealth-related variables. For example, being a wage worker, a farmer, or self-employed is associated with higher well-being than the reference category (which is the group formed by the inactive population and those who do household work). However, such an effect is economically and statistically larger only for households not receiving remittances. Furthermore, working more hours leads to lower well-being, particularly for households without remittances (see Pouwels et al., 2008). Conditional on other wealth and income measures, land size is negatively correlated with SWB, with a larger effect found among remittance-receiving households. One possible interpretation is that individuals in this group need additional labor in order to maintain the land and carry out agricultural activities after the migrant has left. Finally, and perhaps as expected, both house size and house value are positively correlated with SWB, with a stronger effect for house size.

*Socio-demographic Characteristics.* The estimates for age and age-squared suggest the existence of a U-shaped relationship, which very much aligns with international evidence (see Blanchflower and Oswald, 2008). Since the sample of left-behind individuals is relatively “old” (the average age is 48), the minimum point of the age effect is located between 55 and 60. Males report higher SWB compared to females, although it is important to point out that the group of left-behind males is highly self-selected. In line with other studies, we observe a SWB “premium” for marriage (e.g., Helliwell, 2003). Health is a strong predictor of SWB. Individuals experience lower SWB as their health worsens (the omitted category is “very good health”). We control for two additional health-related determinants: height and weight. Weight appears to be positively correlated with SWB, while height seems to be unrelated to it.<sup>9</sup> Education is another strong predictor of SWB, once again in line with other studies

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<sup>9</sup> Using BMI (and/or its square term) instead of weight and height does not change our key estimates.

(e.g., Helliwell, 2003). The few households holding urban hukou (6% of the total) experience higher SWB, though the effect is found only among those who receive remittances. While household size is strongly associated with SWB, we found only a weak relationship with the number of children, in line with the reported findings in Dolan et al. (2008).

*Migration Characteristics.* We control for a rich set of variables capturing the households' migration characteristics. First, we include dummy variables to capture the number of migrants in the households (the base category is "no migrants"). In general, having one or more migrants in the household is negatively associated with SWB. The negative sign is compatible with a migrant's absence having larger costs than benefits in terms of well-being. Recent literature has shown that the absence of household members due to migration can have both positive and negative effects on well-being determinants, such as education and self-employment. For example, Biavaschi et al. (2015) found that in left-behind households, older siblings have a stronger influence on the schooling performance of the youngest. On the other hand, Giulietti et al. (2013) found that the left-behind are less likely to be self-employed when compared to return migrants and individuals who live in non-migrant households.<sup>10</sup> Since these factors are already controlled for in the regression, we interpret the negative estimate as the psychological cost associated with the migrant's absence (albeit often temporary). Since there are no appreciable differences between whether the migrant is the household head or the spouse, the size and magnitude of the migration effect does not seem to depend on which family member has migrated.

Table 2 about here

#### 4.2. Relative Concerns in Rural China

To go one step further, we investigate relative concerns with respect to total household income and report the results in Table 3. For conciseness, we report only the absolute and relative income estimates. Bear in mind that the specifications include the same explanatory variables as in Table 2, except for the addition of the

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<sup>10</sup> Migration could also have an effect on the well-being and other outcomes of children. For example Mu and de Brauw (2015) found that parental migration improves the weight of children left behind in Chinese rural villages. Démurger and Xu (2015) document that parents who migrated to the city and have children in primary school delay their return to the village – consistently with the intention of investing in children's education.

reference group's average income. In the first three columns we check the role of relative concerns by holding the reference group definition (the local county) constant and check the effect of functional form and measure of income used.

When we define incomes in level (first column) or in per capita terms (second column), the relative concern parameter estimate is statistically insignificant. In contrast, when we use our preferred definition (log per capita income) the estimate for relative income is large, negative, and statistically significant. While we are confident about the choice of our definition, as many SWB studies have adopted it before (see e.g., the comprehensive review by Dolan et al., 2008), we note that such a result is rather puzzling.

Table 3 about here

*Reference Groups.* In the remaining columns in Table 3, we explore different reference groups that are alternative to the one “all other people in the same county.” In this exercise, we hold the definition of income (log per capita) constant. We first narrow down the reference group to “all other people in the same village.” As indicated before, a smaller number of individuals is used in this case to calculate the average per capita income (there are on average 10 households per village, resulting in just about 30 non-migrant individuals per village: a minimum of 13 and a maximum of 61). Despite this, results are similar to the baseline, in which we used larger cells (on average 97 households and 315 individuals) to calculate the relative income.<sup>11</sup> When we refine the reference group to all other people in the same county with and without wage employment separately, we once again find estimates that are comparable to the baseline. Finally, we obtain very similar results when we look separately at all other people in the same county who are below and above 40 years old, albeit not very precisely estimated. Overall, these results suggest that the relative income effect is not particularly sensitive to more precise definitions of the reference group.

#### 4.3. Remittances and Relative Concerns

*Baseline Results.* We now decompose the overall household income into income

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<sup>11</sup> Note that income and remittance variation is at the household level. This is why 10 households per village do not provide enough variation.

generated by the activities of people left behind (rural income) and the remittances sent by migrants. Using these two components, we estimate the full model presented in Equation (1). We are mainly interested in the effect of absolute and relative income ( $\alpha_1$  and  $\rho_1$ ) and absolute and relative remittances ( $\alpha_2$  and  $\rho_2$ ). Table 4 presents the results.

Similarly to the results in Table 3, household rural income is positive and significant across all model specifications. Likewise, the relative rural income is statistically significant, with a large negative magnitude (-0.840).<sup>12</sup> Hence, results point to a status effect experienced by rural household members, at least with our baseline reference group definition.

Table 4 shows positive effects of both absolute and relative remittances. Only the latter is statistically significant, with a large estimate (0.873), indicating an important signal effect. The absolute remittances effect is positive yet not significant when estimated on the overall sample, half of which is composed of non-receivers. When we focus only on households receiving remittances (column III of Table 4), the effect is almost significant and similar in size to that in the basic specification with no relative effects (column I of Table 2). Nevertheless, it is true that the estimate of the relative remittances is stronger than the one of absolute remittances, making us think that the “information” content of remittances (coming from the reference group) is more relevant than the well-being effect of absolute remittances. Another possible explanation is that remittances indicate the absence of relatives and may be associated with the welfare loss due to this separation. Further results on the subsample of households without a migrant, who might still receive remittances from friends or extended family, indeed show a significant effect of absolute remittances (column I of the lower panel in Table 5). In sum, our baseline results in Table 3 imply that rural individuals experience a substantial status effect with respect to income and an equally large signal effect with respect to remittances. The result is very similar when we narrow the sample to include only household heads.

*Who is affected?* Relative concerns with respect to remittances might be different

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<sup>12</sup> One important remark is that when we include remittances in the regression, relative concerns are not sensitive to income concept. We have estimated alternative models using per capita income without log transformation, finding results remarkably similar to those obtained with using our preferred definition of income.

among households who receive remittances (around 48% of the sample) and those who do not. In the third and fourth column of Table 4, we analyze the results separately for the two groups. The household income is positive for both groups, albeit stronger for households without remittances. Interestingly, the relative concerns with respect to income are present only among households not receiving remittances. These results are consistent with the fact that the main source of income for households without remittances is rural income, while the other group also relies on money sent by migrants. Absolute remittances, which by construction are introduced only in the remittance-receiving households, are found to be positively related to their SWB, yet the effect is not precisely estimated. On the contrary, relative remittances positively influence SWB in both groups, although the effect is almost twice as large for households receiving remittances.

*Reference Groups.* We explore the sensitivity of relative remittances to the definition of the reference group. To do so, we keep the county as the regional orbit of comparison and add some additional criteria. The first two alternative reference groups involve similarity in age and wage employment status (columns V and VI of Table 4). We find very similar results to those in the first column. In column VII, we recognize that not all households with migrants receive remittances. We explore what happens if we calculate relative income and remittances among households with and without migrants. The results are slightly different than those in the first column, yet the pattern is the same. In particular, the signal effect of relative remittances is stronger while the status effect of relative income is weaker.

*Does income inequality explain the results?* Due to their substantial size, remittances are expected to affect the income distribution within the receiving regions. The empirical evidence is mostly based on international migration and suggests that the relationship between remittances and income inequality is unclear. Moreover, income inequality might have a distinct effect on SWB, albeit this could be “confounded” with the relative income effect (on this point see, e.g., Senik, 2008). We first calculate the Gini index in the county using both the pre- and post-remittances per capita household income. We find that the remittances’ contribution to income inequality varies across regions: around 46% of the counties exhibit higher income inequality after receiving remittances. Then we further control for the additional effect of

remittance contribution to inequality, using the county-level Gini, in the SWB regression. Results in the last column in Table 4 show that accounting for differential income inequality before and after remittances does not affect our baseline results. The sign of the correlation is negative—implying that increases in inequality due to remittances reduce SWB—but is statistically insignificant.<sup>13</sup> As expected, the strength of the signal from the remittances in the reference group is slightly reduced; yet, compared to the baseline, the reduction is not statistically significant.

Table 4 about here

#### 4.4. Heterogeneity

Our sample comprises heterogeneous groups with respect to economic activity, migration status, and other characteristics. It is plausible to expect that the status and signal effect could differ across groups. For example, educated individuals might have a different perception of the importance of relative income compared to those with fewer years of education (who typically have less of a chance to migrate and to obtain better jobs). Similarly, such perceptions could differ depending on individuals' age; for example, young individuals have a large share of their working life still ahead of them. We therefore investigate how our main results differ across various groups through a simple modification of the baseline empirical model. We first define a dummy variable indicating a specific individual characteristic,  $D$ , and then we interact  $D$  and  $(1 - D)$  with the absolute and relative rural income and remittance variables. In practice, we test whether the parameter estimates for these two groups are statistically different. We outline the modified econometric specification below. In Table 5 we only present the estimates of  $\alpha_{21}$ ,  $\alpha_{20}$ ,  $\rho_{21}$  and  $\rho_{20}$ .

$$SWB_i^* = \alpha_1 \log(Y_i) + \rho_1 \log(R_i) + \alpha_{21} \log(Y_j^r) * D_i + \alpha_{20} \log(Y_j^r) * (1 - D_i) \\ + \rho_{21} \log(R_j^r) * D_i + \rho_{20} \log(R_j^r) * (1 - D_i) + \mathbf{x}_i' \boldsymbol{\beta} + \theta * D_i + \eta_k + \varepsilon_i \quad (4)$$

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<sup>13</sup> While here we focus on the change of income inequality to identify which part is due to remittances, an important issue is the effect of the inequality level on SWB. In unreported results, we estimate two SWB regressions that include the inequality before and after remittances. Similarly to other studies, we find that income inequality is positively correlated with SWB (Kingdon and Knight 2007; Senik, 2008; Knight et al., 2009). While one might expect income inequality to affect utility negatively, inequality could also capture rural households' income possibilities, therefore positively correlating with SWB.

*Economic Characteristics and Income Distribution.* A large share of households have members in wage employment, which could influence the role of both absolute and relative remittances. We investigate this aspect in the first two columns in Table 5 (upper panel). The first remarkable aspect is that wage earners exhibit a negative correlation with remittances sent by other household members. This suggests a sort of dissatisfaction or envy effect, although the effect is small (-0.103) and statistically insignificant. The opposite effect, slightly larger (0.121) but also statistically insignificant, is found among individuals who are not wage earners. One possible explanation is that since wage earners are individuals who are likely to migrate in the near future, they tend to compare their income with that of migrants in the local region (using remittances as a proxy for the urban wage), which likely generates a status effect. Furthermore, we find that the remittance signal effect is smaller for wage workers than for other individuals (0.651 versus 0.910).

Next, we compare farmers with other individuals in the third and fourth columns. Interestingly, the income status effect and the remittance signal effect are larger in terms of absolute magnitude for this group. In the fifth and sixth columns we compare individuals living in counties where the share of wage workers is above the median of all counties versus those living in the remaining counties. In areas where wage workers are overrepresented, the income status effect is relatively stronger and the remittance signal effect is relatively weaker, aligning with the results in the first two columns.

The second set of results, in columns five and six in Table 5, focuses on income distribution in the reference groups. We hypothesize that relative concerns with respect to income and/or remittances might be different depending on the regional income level. The relative income concerns increases as one moves from poorer to richer counties or as the absolute income increases above some subsistence level (Frey and Stutzer; 2002; Clark et al., 2008; Akay and Martinsson, 2011). To test this hypothesis, we generate an indicator for counties with income above the median of all counties. Interestingly we find that the relative income status effect is much stronger for relatively richer counties, and in fact, it is close to zero for relatively poorer counties. It seems that a higher economic level in the region relates to higher relative concerns (Clark et al., 2008). On the contrary, the signal effect from remittances is

weaker in relatively richer counties.

In columns seven and eight we investigate the role of income inequality by interacting our key variables with an indicator for counties where remittance flows reduced the inequality from rural incomes. We find a lower status effect with respect to income in regions where income inequality has decreased. The signs and magnitudes of other estimates are very similar to the baseline model, implying once more that income inequality does not play a major role in explaining our results.

*Migration Experience and Intensity.* Individuals' migration status might also affect both the status and the signal effect. We investigate how our results differ depending on an individual's migration experience as well as on the migration "intensity" within the reference group. We report the results in the lower panel of Table 5. The results are striking: in the first two columns, we observe that only individuals in households without migrants experience the status effect with respect to income while the signal effect is very strong and statistically significant for individuals in households with at least one migrant.

We further create an indicator for counties with a number of migrants above the median. In columns three and four, we consistently find that the relative income effect is only significant in counties where households have fewer migrants, i.e. households who rely more on the resources generated by rural activities. On the contrary, the relative remittance effect is much stronger in counties with relatively more migrants. In the fifth and sixth columns we explore the results depending on whether the individual has or has not migrated in the past. The results between the two groups resemble each other, indicating that previous migration experience does not bear consequences on the current status or signal effect.

Table 5 about here

*Individual Heterogeneity.* In the last columns we explore the heterogeneity of the results through selected socio-demographic characteristics. In the seventh and eighth columns of Table 5 (lower panel), we distinguish between individuals who are above and below 40 years old. We find a much stronger status effect from relative income among the young and a much stronger signal effect from relative remittances among

the older. One possible explanation is that the older people get, the more likely they are to receive remittances (as they become less likely to migrate or work) and thus the role of relative remittances becomes stronger. This suggests higher “income competition” among the young. Furthermore, it is important to remind the reader that in the context of rural China, remittances are often sent to support elderly parents; this could explain the discrepancies in the signal effect from remittances. On the contrary, education does not seem to play a big role when we distinguish between individuals who have an education above or below the median (the threshold is 8 years of schooling).

## **5. Robustness and Self-Selection**

In this section we first investigate the robustness of our results with some additional tests. We then explore the potential confounding role of selectivity into migration. Finally, we present a counterfactual analysis accounting for the absent migrant’s income and expenditures.

### **5.1. Further Robustness Checks**

*Additional Controls and Clustering.* We investigate the sensitivity of our results with respect to alternative specifications and measures. In unreported results, we first look at the role of control variables. We compare specifications where we progressively add control variables into Equation (1). Core results are remarkably robust to the choice of controls. We note the important role of geographic indicators to capture regional differences such as prices. In our baseline, we use province fixed-effects. In the models in which we define the reference group at the village level, we also introduce county fixed-effects and find essentially similar results. Additionally, we experiment what happens when we cluster standard errors at the county level instead of at the household level. As one would expect, the standard errors become somewhat larger but the statistical significance of our key results is only partially affected.

*Estimators and Reference Income.* Throughout the paper we use a linear model as our preferred specification, partly due to the fact that ordered probit models do not allow for an easy ceteris paribus interpretation of the parameter estimates. For robustness, we re-estimate the baseline using an ordered probit. The first column in Table 6

presents the results. The key parameters' signs and significance are very much in line with our baseline OLS estimates. In the second column, we use median instead of average income and remittances, as the median is more robust to extreme values within reference groups. However, this particular measurement does not seem to change our conclusions.

*Unobserved Heterogeneity.* Our approach and data do not allow us to control for the time-invariant unobserved individual effects (e.g., genetic predisposition, personality characteristics, etc.). These characteristics are found to be very important in explaining individuals' SWB (Boyce and Wood, 2011). In this robustness check, we follow the strategy developed in Akay et al. (2012) to partially control for these latent characteristics. The authors suggest using GHQ-11 instead of GHQ-12 as a response variable, the twelfth question ("How happy are you when you consider each aspect of your life?") being kept as a control variable to proxy for time-invariant individual characteristics. The results in the third column in Table 6 suggest only minor changes with respect to our baseline.

## 5.2. Selective Migration

There are different potential sources of self-selection that might affect our result. One of the most important relates to whether people's intrinsic preferences towards status generate a strong incentive to migrate. Stark and Yitzhaki (1988) and Stark (2006) discuss the fact that the desire for income status may be one of the reasons why individuals decide to migrate. Using a household panel survey from two provinces in rural China, Wu (2008) finds evidence supporting this argument. The paper reports that lower income positions increase the chance that a household member will migrate. We tackle this question by using a selection specification to model the migration decision.

One of the features of our sample is that we have socio-demographic characteristics (except SWB information) for individuals who are currently migrants in the urban areas. This allows us to specify a selection model as follows. The individual decides to stay or migrate as a function of absolute and relative income and remittances, plus a set of other determinants included in  $z_i$ :

$$s_i = 1(\alpha_1^s \log(Y_i) + \rho_1^s \log(Y_i^r) + \alpha_2^s \log(R_i) + \rho_2^s \log(R_i^r) + z_i' \gamma + w_i > 0), \quad (5)$$

where  $s_i$  is an indicator taking the value 1 if the individual is a migrant (which in our data corresponds to whether the SWB of individual  $i$  is observed);  $\alpha_1^s, \rho_1^s, \alpha_2^s, \rho_2^s$  and  $\gamma$  are the first-stage parameters to be estimated;  $w_i$  is the error term of the sample selection equation assumed to be normally distributed with a zero mean and unit variance. In the second stage, we estimate the SWB equation conditional on selection. The selection-corrected SWB equations are defined as follows:

$$SWB_i^* = \alpha_1^t \log(Y_i) + \rho_1^t \log(Y_i^r) + \alpha_2^t \log(R_i) + \rho_2^t \log(R_i^r) + x_i' \lambda + u_i, \quad (6)$$

$$SWB_i = SWB_i^* \times s_i. \quad (7)$$

Equation (5) is the selection and Equation (6) is the target SWB equation, and our aim is to estimate the selection-corrected absolute and relative income and remittances, given by parameters  $\alpha_1^t, \rho_1^t, \alpha_2^t$ , and  $\rho_2^t$ . We simultaneously estimate Equations (5–7). In this model, the error terms are specified as  $u_i \sim N(0, \sigma_u^2)$ ,  $w_i \sim N(0, 1)$ , and the correlation between equations is  $\rho_{uw} = Corr(u_i, w_i)$ .

Identification requires at least one exclusion restriction, which will be used in the selection equation and excluded from the target SWB equation, i.e., a variable that affects SWB only through migration but not directly. The first instrument is based on the distance of the village from: (i) the nearest government building, and (ii) the nearest port or station. It is categorized by a variable with five values, ranging from the shortest to the longest distance. By combining the distance variables (i) and (ii), we introduce 10 dummy variables in the selection equation. Villages close to government buildings or stations have individuals who are more likely to migrate out. The other instrument is the birth order of the individual. First-born are less likely to migrate, since they often are responsible for taking care of the family. Hence both instruments are thought to influence migration without having a direct effect on SWB.

Results from the selection equation suggest that relative income and remittances are positively correlated with the migration decision, supporting the findings of Stark

(2006) and Wu (2008).<sup>14</sup> The correlation between the equations is significant (between -0.10 and -0.15, depending on the instruments used). Our main interest is on the corrected estimates of absolute and relative income and remittances ( $\alpha_1^t, \rho_1^t, \alpha_2^t$ , and  $\rho_2^t$ ). The estimates presented in the fourth and fifth columns in Table 6 are very similar to those in Table 4, suggesting that our main results are robust to self-selection into migration. We have tested additional instruments such as “migration intentions” and “network size in urban areas” in combination with distance and birth order. We have also used the interaction between birth order and distance as an alternative instrument. Results essentially reflect those in Table 6.

### 5.3. Counterfactual Income and Net Remittances

The income level of households with migrants is expected to be comparatively lower than that of households without migrants, since the former does not account for the absent migrants’ income. The migrants’ only contribution to the household income is remittances. Failure to account for the potential income contribution of absent migrants might lead to miscalculating absolute or relative income and remittances. In this section, we simulate migrants’ counterfactual income and expenditures in order to calculate net remittances, that is, migrants’ net contribution to the household income (Barham and Boucher, 1998; Howell, 2014). To do so, we use the available information from the migrant’s rural village and at the same time control for migration self-selection.

The income generating process of an individual within the village is as follows. The individual first decides whether to stay or migrate:

$$m_i = \mathbf{1}(g_i' \psi + \varphi_i > 0) \quad , \quad (8)$$

where  $m_i$  is the selection indicator for an individual to migrate;  $g_i$  is a vector of socio-demographic and economic characteristics affecting migration. As in the previous specification,  $\varphi_i$  is the error in the migration equation, assumed to follow a normal distribution with zero mean and unit variance. We then define the selection-corrected income equation using log household income per capita income as follows:

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<sup>14</sup> We do not report the first stage estimation for conciseness, yet the results align with the literature.

$$\mathbf{log}(Y_i^*) = x_i' \boldsymbol{\mu} + u_i \quad (9)$$

$$\log(Y_i) = \log(Y_i^*) \times m_i . \quad (10)$$

Using the conditional expected value of this model, we simulate the counterfactual income of the migrants in our sample:

$$E[Y_i | x_i, m_i = 1] = x_i' \boldsymbol{\mu} + \rho_{u\varphi} \sigma_u \frac{\phi(g_i' \boldsymbol{\psi})}{\Phi(g_i' \boldsymbol{\psi})} \quad (11)$$

where  $\phi$  and  $\Phi$  are the probability density function and cumulative distribution function of the standard normal random variable. The model is estimated simultaneously using a maximum likelihood estimator;  $\rho_{u\varphi} = \mathbf{Corr}(u_i, \varphi_i)$  is the correlation between the selection and income equations. Predicted values from Equation (11) provide an estimate of what the migrant's income would have been had he or she not migrated. We use the identical procedure to obtain the counterfactual expenditures of migrants. In modeling migration we use the same instruments as above, i.e., distance and birth order. To obtain the net remittances, we subtract the difference between the counterfactual income and counterfactual expenditure from the actual remittances. The distribution of net remittances is similar to that of actual remittances, yet a significant portion of net remittances is negative since some migrants contribute more to the household income in the counterfactual situation, i.e., had they not migrated.

As a last step, we calculate the mean net rural income and net remittances within the reference group and use this to estimate the baseline model specification in Equation (8). The last column in Table 6 reports the results. Since there are several negative values in the net remittances, we use values in level and not in log—hence magnitudes are not directly comparable with the other models in the table. However, the pattern of the estimates remarkably aligns with the baseline, as we find a negative relative income effect and a positive relative remittances effect.

Table 6 about here

## 6. Conclusions

To the best of our knowledge, this is the first paper investigating the effect of remittances on households' relative concerns. Using the Rural to Urban Migration in China survey and a subjective well-being approach on a sample of individuals living in major migrant sending provinces, we simultaneously investigate relative income and remittances. Our main result suggests that relative concerns matter among rural individuals and households. In particular, the relative rural income effect is negative (a status effect) while the relative remittances effect is positive (a signal effect). The absolute magnitudes of the two effects are very similar. These results are robust with respect to the reference group definition, the measure of relative concerns, and several self-selection issues.

Our study has two major implications. First, we provide a potential explanation of why relative concerns with respect to income are found to be weak or negligible in some developing countries. We show that the effect of total income depends on its components: the part accruing to remittances and the part generated by rural activities. Failing to disentangle these aspects would confound the status and signal effects potentially experienced by rural households. Second, policy aiming to improve rural households' welfare should take into account the potential contrasting outcomes in terms of relative concerns with respect to rural income and remittances. One important policy issue relates to the motivation of remittances and how remittances influence public transfers, e.g., redistributive interventions and public goods. The literature has long discussed whether remittances are motivated through intra-household "altruism" or an "implicit contractual agreement" between family members (Lucas and Stark, 1985). Our result suggests that remittances produce "external effects," that is, through comparisons with individuals outside the household. This, in turn, could significantly affect the trade-off between private and public transfers. We leave the investigation of such intriguing questions to further research.

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## Appendix

## Appendix A. Descriptive Statistics of Control Variables

	Whole Sample				Households without Remittances				Households with Remittances			
	All		HH Head		All		HH Head		All		HH Head	
	Mean	SD.	Mean	SD.	Mean	SD.	Mean	SD.	Mean	SD.	Mean	SD.
Subjective Well-Being (GHQ-12)	28.081	(5.179)	28.648	(4.891)	28.267	(5.112)	28.838	(4.789)	27.856	(5.251)	28.412	(5.006)
Age	48.106	(11.029)	50.874	(9.235)	47.494	(11.467)	50.301	(9.807)	48.845	(10.431)	51.585	(8.421)
Male	0.557	(0.497)	0.954	(0.209)	0.573	(0.495)	0.961	(0.193)	0.538	(0.499)	0.945	(0.227)
Married	0.934	(0.249)	0.954	(0.210)	0.924	(0.265)	0.952	(0.214)	0.946	(0.227)	0.956	(0.205)
Good Health	0.491	(0.500)	0.497	(0.500)	0.495	(0.500)	0.499	(0.500)	0.487	(0.500)	0.494	(0.500)
Average Health	0.232	(0.422)	0.231	(0.421)	0.220	(0.415)	0.214	(0.410)	0.247	(0.431)	0.251	(0.434)
Poor Health	0.053	(0.225)	0.045	(0.208)	0.050	(0.218)	0.045	(0.207)	0.057	(0.232)	0.046	(0.210)
Years of Education	6.742	(3.065)	7.279	(2.629)	6.964	(3.122)	7.442	(2.698)	6.476	(2.974)	7.077	(2.527)
Urban Hukou	0.060	(0.238)	0.056	(0.230)	0.082	(0.274)	0.077	(0.267)	0.035	(0.183)	0.030	(0.170)
One Child	0.262	(0.440)	0.247	(0.431)	0.302	(0.459)	0.291	(0.454)	0.215	(0.411)	0.192	(0.394)
Two Children	0.402	(0.490)	0.423	(0.494)	0.392	(0.488)	0.421	(0.494)	0.415	(0.493)	0.426	(0.495)
More than Two Children	0.280	(0.449)	0.303	(0.459)	0.243	(0.429)	0.262	(0.440)	0.326	(0.469)	0.353	(0.478)
Number HH Members	4.060	(1.376)	3.965	(1.393)	3.749	(1.306)	3.629	(1.293)	4.436	(1.363)	4.381	(1.401)
Relationship to Head: Head	0.522	(0.500)	1.000	(0.000)	0.528	(0.499)	1.000	(0.000)	0.513	(0.500)	1.000	(0.000)
Relationship to Head: Spouse	0.374	(0.484)	0.000	(0.000)	0.362	(0.481)	0.000	(0.000)	0.389	(0.488)	0.000	(0.000)
Relationship to Head: Child	0.083	(0.276)	0.000	(0.000)	0.094	(0.292)	0.000	(0.000)	0.070	(0.255)	0.000	(0.000)
Spouse is a Migrant	0.018	(0.132)	0.023	(0.151)	0.005	(0.073)	0.007	(0.083)	0.032	(0.177)	0.044	(0.205)
HH Head is a Migrant	0.044	(0.206)	0.000	(0.000)	0.010	(0.101)	0.000	(0.000)	0.086	(0.280)	0.000	(0.000)
One Child is a Migrant	0.187	(0.390)	0.200	(0.400)	0.136	(0.342)	0.142	(0.349)	0.250	(0.433)	0.272	(0.445)
Two Children are Migrants	0.158	(0.365)	0.175	(0.380)	0.049	(0.215)	0.057	(0.232)	0.290	(0.454)	0.322	(0.467)
Other HH Member is Migrant	0.023	(0.150)	0.022	(0.147)	0.011	(0.107)	0.010	(0.100)	0.037	(0.188)	0.037	(0.189)
Migrated in the Past	0.148	(0.356)	0.181	(0.385)	0.134	(0.341)	0.166	(0.372)	0.166	(0.372)	0.200	(0.400)
No Migrants in HH	0.612	(0.487)	0.609	(0.488)	0.799	(0.401)	0.793	(0.405)	0.386	(0.487)	0.382	(0.486)
One Migrant in HH	0.206	(0.405)	0.202	(0.401)	0.145	(0.352)	0.145	(0.352)	0.280	(0.449)	0.272	(0.445)
Two Migrants in HH	0.126	(0.332)	0.133	(0.339)	0.044	(0.205)	0.049	(0.217)	0.226	(0.418)	0.236	(0.425)
More than Two Migrants in HH	0.055	(0.229)	0.056	(0.231)	0.012	(0.108)	0.013	(0.112)	0.108	(0.310)	0.110	(0.314)
Remittances (1000 CNY)	3.823	(7.201)	3.781	(7.258)					8.432	(8.689)	8.471	(8.850)
Remittances per Capita (1000 CNY)	3.365	(5.220)	3.357	(5.246)					6.217	(6.725)	6.282	(6.799)
Household Income (1000 CNY)	22.363	(23.895)	22.203	(24.652)	27.370	(29.048)	26.785	(30.170)	16.326	(13.244)	16.519	(13.200)
Household per C. Income (1000 CNY)	14.962	(15.429)	15.351	(16.520)	17.727	(18.362)	18.050	(19.789)	11.628	(9.914)	12.003	(10.272)
Wage Employment	0.225	(0.418)	0.247	(0.431)	0.281	(0.449)	0.295	(0.456)	0.158	(0.364)	0.188	(0.391)
Self-employment	0.072	(0.258)	0.094	(0.291)	0.096	(0.294)	0.120	(0.325)	0.043	(0.203)	0.061	(0.239)
Observations	11624		6063		6354		3357		5270		2706	

Source: RUMiC 2008. Notes: Standard deviations in parentheses. Income and remittances are in 1,000 CNY.

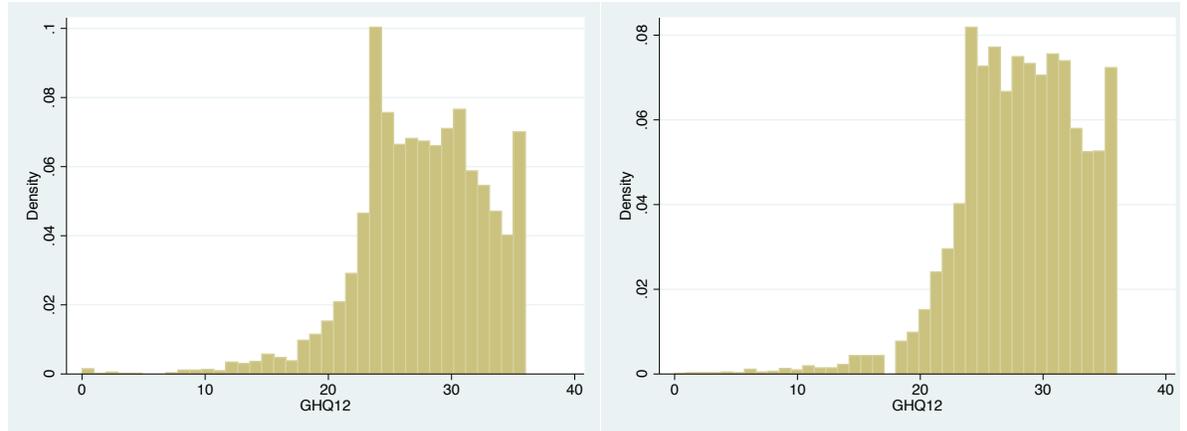
## Appendix B: General Health Questionnaire (GHQ-12)

<p>1- When you are doing something, do you find that (1) Can concentrate; (2) Attention occasionally diverted; (3) Attention sometimes diverted; (4) Attention frequently diverted, cannot concentrate</p> <p>2- Do you often lose sleep over worry? (1) Not at all; (2) Occasionally; (3) Fairly often; (4) Very often</p> <p>3 - Can you play a useful part in things? (1) Always can; (2) Can play some positive roles; (3) Can play positive roles poorly; (4) Cannot play a positive role</p> <p>4- Are you capable of making decisions? (1) Always have own opinions; (2) Sometimes have own opinions; (3) Do not have many own opinions; 4) Do not have any personal opinion at all</p> <p>5- Are you constantly under strain? (1) Never; (2) Sometimes; (3) Fairly often; (4) Very often</p> <p>6- Do you feel you couldn't overcome difficulties? (1) Never; (2) Sometimes; (3) Fairly often; (4) Very often</p>	<p>7- Are you able to enjoy day-to-day activities? (1) Very interesting; (2) Fairly interesting; (3) Not very interesting; (4) Not interesting at all</p> <p>8- Are you able to face problems? (1) Never; (2) Seldom; (3) Sometimes; (4) Always</p> <p>9- Do you feel depressed? (1) Not at all; (2) A little bit; (3) Fairly seriously; (4) Very seriously</p> <p>10- Do you always lack confidence? (1) Not at all; (2) A little bit; (3) Fairly seriously; (4) Very seriously</p> <p>11- Do you often think that you have no value? (1) Not at all; (2) A little bit; (3) Fairly seriously; (4) Very seriously</p> <p>12- Are you happy when you consider each aspect of your life? (1) Very happy; (2) Fairly happy; (3) Not very happy; (4) Not happy at all</p>
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Source: RUMiC 2007. See Goldberg (1978) for questions and use of the GHQ.

Figures and Tables

Figure 1. Distribution of SWB

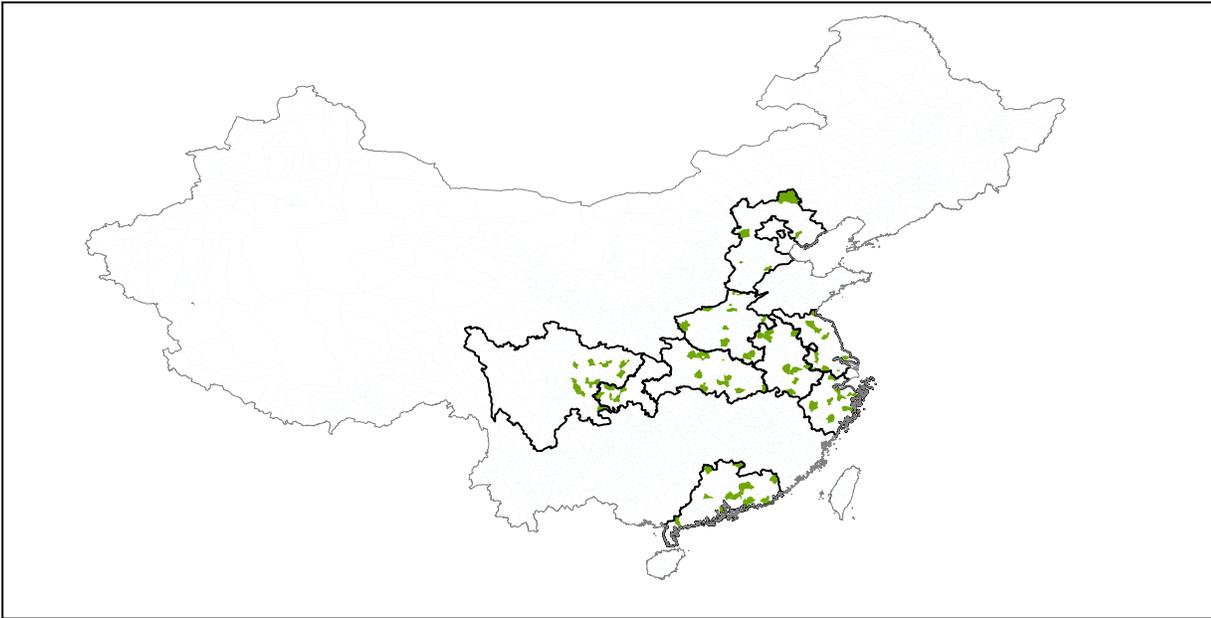


a) *Individuals who receive remittances*

b) *Individuals who do not receive remittances*

Source: RUMiC 2007. Notes: GHQ-12 index obtained by summing the 12 answers of the General Health Questionnaire (GHQ).

Figure 2. Counties sampled by RUMiC



Note: The green areas represent the counties sampled by RUMiC. The thick black borders delimit the nine provinces: Anhui, Chongqing, Guangdong, Hebei, Henan, Hubei, Jiangsu, Sichuan, and Zhejiang.

Table 1. Descriptive Statistics

	Whole Sample				Households without Remittances				Households with Remittances			
	All		HH Head		All		HH Head		All		HH Head	
	Mean	SD.	Mean	SD.	Mean	SD.	Mean	SD.	Mean	SD.	Mean	SD.
Subjective Well-Being (GHQ-12)	28.081	(5.179)	28.648	(4.891)	28.267	(5.112)	28.838	(4.789)	27.856	(5.251)	28.412	(5.006)
Remittances	3.823	(7.201)	3.781	(7.258)					8.432	(8.689)	8.471	(8.850)
Remittances per Capita	3.365	(5.22)	3.357	(5.246)					6.217	(6.725)	6.282	(6.799)
Household Income	22.363	(23.895)	22.203	(24.652)	27.370	(29.048)	26.785	(30.170)	16.326	(13.244)	16.519	(13.200)
Household per Capita Income	14.962	(15.429)	15.351	(16.520)	17.727	(18.362)	18.050	(19.789)	11.628	(9.914)	12.003	(10.272)
Observations	11624		6063		6354		3357		5270		2706	

Source: RUMiC 2008. Notes: Standard deviations in parentheses. Income and remittances are in 1,000 CNY. GHQ-12 index obtained by summing the 12 answers of the General Health Questionnaire (GHQ).

Table 2. Determinants of Subjective Well-Being in Rural China

Dependent variable: GHQ-12	Whole sample		HH with remittances		HH without remittances	
	All	HH head	All	HH head	All	HH head
<i>Economic Characteristics</i>						
Log HH Income per Capita	0.210** (0.084)	0.256*** (0.091)	0.206 (0.135)	0.293** (0.148)	0.237** (0.112)	0.243** (0.119)
Log Remittances per Capita	0.175** (0.068)	0.176** (0.076)	0.198* (0.111)	0.293** (0.123)		
Wageworker (D)	1.111*** (0.270)	1.011*** (0.356)	0.086 (0.480)	0.523 (0.615)	1.568*** (0.323)	1.147*** (0.426)
Self-employed (D)	1.129*** (0.312)	1.232*** (0.382)	0.241 (0.566)	0.739 (0.661)	1.502*** (0.371)	1.357*** (0.456)
Farmer (D)	0.685*** (0.165)	0.618** (0.269)	0.783*** (0.265)	1.173*** (0.443)	0.553*** (0.205)	0.186 (0.327)
Hours of Work	-0.008* (0.004)	-0.007 (0.005)	0.006 (0.008)	0.009 (0.009)	-0.014*** (0.005)	-0.015*** (0.006)
Land Size (Mu)	-0.022* (0.014)	-0.023 (0.015)	-0.038 (0.023)	-0.053** (0.025)	-0.017 (0.016)	-0.011 (0.017)
House Size (m <sup>2</sup> )	0.507*** (0.140)	0.473*** (0.151)	0.360 (0.227)	0.516** (0.253)	0.530*** (0.177)	0.410** (0.190)
House Value (1000 CNY)	0.078 (0.074)	0.125 (0.080)	0.111 (0.113)	0.104 (0.124)	0.102 (0.097)	0.164 (0.104)
<i>Socio-demographic Characteristics</i>						
Age	-0.118*** (0.043)	-0.009 (0.062)	-0.088 (0.069)	-0.002 (0.106)	-0.131** (0.054)	-0.008 (0.079)
Age squared	0.001** (0.000)	0.000 (0.001)	0.001 (0.001)	0.000 (0.001)	0.001** (0.001)	0.000 (0.001)
Male	0.756*** (0.191)	0.901*** (0.325)	0.809*** (0.286)	1.144** (0.444)	0.734*** (0.258)	0.670 (0.479)
Married	1.173*** (0.255)	1.538*** (0.315)	1.233*** (0.389)	1.579*** (0.474)	1.148*** (0.331)	1.529*** (0.418)
Good Health	-2.228*** (0.121)	-2.012*** (0.140)	-2.262*** (0.189)	-2.317*** (0.221)	-2.165*** (0.158)	-1.797*** (0.181)
Average Health	-3.728*** (0.154)	-3.349*** (0.179)	-3.602*** (0.227)	-3.368*** (0.263)	-3.803*** (0.211)	-3.389*** (0.246)
Poor Health	-8.143*** (0.316)	-7.216*** (0.440)	-8.052*** (0.471)	-7.374*** (0.698)	-8.174*** (0.422)	-7.043*** (0.553)
Years of Education	0.166*** (0.018)	0.140*** (0.024)	0.185*** (0.028)	0.131*** (0.039)	0.142*** (0.024)	0.139*** (0.031)

Height (cm)	0.014 (0.010)	-0.002 (0.013)	0.020 (0.015)	0.005 (0.020)	0.008 (0.013)	-0.006 (0.017)
Weight (kg)	0.014** (0.007)	0.019** (0.009)	0.007 (0.010)	0.008 (0.013)	0.023*** (0.009)	0.029** (0.011)
Urban Hukou	0.113 (0.217)	0.408 (0.250)	0.841** (0.395)	1.845*** (0.484)	-0.076 (0.256)	0.001 (0.287)
One Child	0.086 (0.310)	0.665* (0.388)	0.515 (0.533)	1.036 (0.648)	-0.296 (0.367)	0.358 (0.470)
Two Children	0.181 (0.315)	0.564 (0.382)	0.396 (0.542)	0.686 (0.629)	0.044 (0.370)	0.518 (0.466)
More than Two Children	0.079 (0.329)	0.559 (0.398)	0.515 (0.558)	0.949 (0.652)	-0.297 (0.391)	0.268 (0.488)
# HH Members	0.232*** (0.050)	0.226*** (0.055)	0.307*** (0.081)	0.386*** (0.089)	0.198*** (0.068)	0.147** (0.074)
<i>Migration Characteristics</i>						
HH Head Migrant	0.086 (0.261)		0.317 (0.300)		-0.234 (0.715)	
Spouse Migrant	-0.166 (0.414)	-0.277 (0.394)	-0.033 (0.465)	-0.182 (0.447)	0.237 (0.905)	-0.119 (0.879)
Has Migrated before 2007	-0.076 (0.136)	-0.228 (0.159)	-0.056 (0.202)	-0.300 (0.250)	-0.063 (0.187)	-0.186 (0.207)
One Migrant in HH	-0.644*** (0.144)	-0.711*** (0.158)	-0.928*** (0.218)	-0.887*** (0.238)	-0.561*** (0.195)	-0.660*** (0.219)
Two Migrants in HH	-0.550*** (0.195)	-0.566*** (0.213)	-0.977*** (0.259)	-0.986*** (0.281)	-0.008 (0.329)	0.035 (0.362)
Three or More Migrants in HH	-1.136*** (0.291)	-1.174*** (0.331)	-1.665*** (0.372)	-1.810*** (0.420)	-1.369** (0.612)	-1.462** (0.700)
Constant	24.377*** (1.872)	22.707*** (2.564)	22.072*** (3.005)	20.442*** (4.172)	25.524*** (2.401)	23.798*** (3.284)
R-squared	0.234	0.191	0.217	0.181	0.260	0.214
Observations	11624	6063	5270	2706	6354	3357

Source: RUMiC 2008. Notes: Models estimated using OLS. \*\*\*/\*\* indicate significance at the 10%, 5%, 1% level. Robust standard errors clustered at the household level are shown in parentheses. (D) indicates dummy variables. The model includes indicators for the 10 provinces as well as dummies indicating the relation to the household head (estimates are omitted). Per capita income and remittances are calculated using the modified OECD equivalence scale, which uses the following weights: 0.5 for each adult at home and 0.3 for children. GHQ-12 index obtained by summing the 12 answers of the General Health Questionnaire (GHQ).

Table 3: Relative Concerns in Rural China with Alternative Model Specifications and Reference Groups

Dependent variable: GHQ-12	Baseline			Alternative Reference Groups		
	Income	Income per Capita	Log Income per Capita	Village	County + Wageworker	County + Age <40
	I	II	III	IV	V	VI
Total HH income (a)	0.007*** (0.003)	0.015*** (0.004)	0.369*** (0.100)	0.510*** (0.111)	0.384*** (0.101)	0.349*** (0.100)
Mean HH Income in reference group	0.001 (0.009)	-0.014 (0.015)	-0.504** (0.247)	-0.631*** (0.169)	-0.594** (0.240)	-0.335 (0.239)
R-Squared	0.233	0.234	0.234	0.235	0.234	0.234
Observations	11624	11624	11624	11624	11624	11624

Source: RUMiC 2008. Notes: Models estimated using OLS. \*\*\*/\*\* indicate significance at the 10%, 5%, 1% level. Robust standard errors clustered at the household level are shown in parentheses. Income is measured in 1,000 CNY. Per capita income is calculated using the modified OECD equivalence scale, which uses the following weights: 0.5 for each adult at home and 0.3 for children. GHQ-12 index obtained by summing the 12 answers of the General Health Questionnaire (GHQ).

Table 4: Estimating Relative Remittances: Baseline Estimates, Remittance Receivers, Shifts in Income Rank and Income Inequality

Dependent variable: GHQ-12	Baseline		Remittance Receivers		Reference Groups			Inequality
	Whole Sample	Only HH Heads	HH with Remittances	HH without Remittances	Reference Group: County + Wage Workers	Reference Group: County + Age<40	Reference Group: County + HH with Migrants	Income Inequality in Reference Groups
	I	II	III	IV	V	VI	VII	VIII
Log HH income pc	0.340*** (0.089)	0.375*** (0.097)	0.269* (0.144)	0.406*** (0.119)	0.353*** (0.090)	0.331*** (0.089)	0.285*** (0.090)	0.342*** (0.089)
Mean Log HH income pc in reference group	-0.840*** (0.219)	-0.709*** (0.238)	-0.403 (0.405)	-1.188*** (0.263)	-0.884*** (0.212)	-0.755*** (0.214)	-0.423** (0.210)	-0.837*** (0.220)
Log remittances pc	0.07 (0.072)	0.067 (0.079)	0.162 (0.112)		0.073 (0.072)	0.052 (0.072)	-0.011 (0.074)	0.067 (0.072)
Mean Log remittances pc in reference group	0.873*** (0.186)	0.902*** (0.200)	1.062*** (0.303)	0.530** (0.259)	0.810*** (0.183)	0.921*** (0.169)	1.097*** (0.181)	0.804*** (0.198)
Change in income inequality due to remittances								-1.728 (1.417)
R-squared	0.238	0.196	0.221	0.266	0.238	0.239	0.239	0.239
Observations	11624	6063	5270	6354	11624	11624	11624	11624

Source: RUMiC 2008. Notes: Models estimated using OLS. \*\*\*/\*\*/\* indicate significance at the 10%, 5%, 1% level. Robust standard errors clustered at the household level are shown in parentheses. Income is measured in 1,000 CNY. Per capita income is calculated using the modified OECD equivalence scale, which uses the following weights: 0.5 for each adult at home and 0.3 for children. Income inequality is measured using the GINI coefficient calculated at the county level. GHQ-12 index obtained by summing the 12 answers of the General Health Questionnaire (GHQ).

Table 5: Heterogeneity

Economic Activity and Income Distribution

Dependent variable: GHQ-12	Wage Earners		Farmers		% of Wageworkers in County above Median		Relatively Rich County		Remittances Decreased County Inequality	
	D=1	D=0	D=1	D=0	D=1	D=0	D=1	D=0	D=1	D=0
	Log HH income pc	0.373** (0.162)	0.323*** (0.096)	0.262** (0.111)	0.447*** (0.121)	0.534*** (0.117)	0.152 (0.122)	0.442*** (0.117)	0.242** (0.122)	0.299*** (0.115)
County mean Log HH income pc	-0.781** (0.353)	-0.880*** (0.239)	-1.013*** (0.282)	-0.790*** (0.278)	-1.410*** (0.366)	-0.717** (0.343)	-1.511*** (0.461)	-0.092 (0.405)	-0.616** (0.285)	-1.090*** (0.308)
Log remittances pc	-0.103 (0.120)	0.121 (0.079)	0.016 (0.086)	0.147 (0.098)	0.101 (0.095)	0.059 (0.094)	0.074 (0.098)	0.072 (0.091)	0.050 (0.092)	0.090 (0.098)
County mean Log remittances pc	0.651** (0.325)	0.910*** (0.204)	1.247*** (0.226)	0.359 (0.266)	0.662** (0.326)	0.975*** (0.235)	0.695** (0.282)	0.883*** (0.286)	0.872*** (0.251)	0.812*** (0.293)

Migration Intensity, Experience, and Individual Characteristics

	HH without Migrants		County Ratio of Migrants above Median		Migrated in the Past		Older than 40 Years Old		Education above Median	
	D=1	D=0	D=1	D=0	D=1	D=0	D=1	D=0	D=1	D=0
	Log HH income pc	0.428*** (0.114)	0.248* (0.127)	0.298** (0.118)	0.364*** (0.120)	0.502*** (0.178)	0.305*** (0.095)	0.419*** (0.099)	0.147 (0.144)	0.224* (0.123)
County mean Log HH pc income	-1.080*** (0.256)	-0.303 (0.350)	-0.225 (0.408)	-1.121*** (0.251)	-0.992** (0.433)	-0.809*** (0.232)	-0.547** (0.239)	-1.568*** (0.339)	-0.920*** (0.303)	-0.808*** (0.250)
Log remittances pc	0.250** (0.114)	-0.096 (0.092)	-0.025 (0.090)	0.144 (0.103)	0.060 (0.134)	0.077 (0.078)	0.044 (0.077)	0.100 (0.141)	0.012 (0.106)	0.093 (0.081)
County mean Log remittances pc	0.455* (0.257)	1.408*** (0.245)	1.632*** (0.264)	0.521 (0.353)	0.894*** (0.345)	0.864*** (0.199)	1.101*** (0.194)	0.185 (0.370)	0.937*** (0.260)	0.845*** (0.222)

Source: RUMiC 2008. Notes: Models estimated using OLS. \*\*\*/\*\*/\* indicate significance at the 10%, 5%, 1% level. Robust standard errors clustered at the household level are shown in parentheses. Income is measured in 1,000 CNY. Per capita income is calculated using the modified OECD equivalence scale, which uses the following weights: 0.5 for each adult at home and 0.3 for children. “Relatively rich counties” have a mean household income per capita above the median. Income inequality is measured using the GINI coefficient calculated at the county level. GHQ-12 index obtained by summing the 12 answers of the General Health Questionnaire (GHQ).

Table 6: Robustness, Self-Selection into Migration, and Net Remittances

	Further Sensitivity Checks			Selection Correction		Net Remittances
	Ordered Probit	Median Income	With GHQ-11	Instrument 1: Distance	Instrument 2: Distance, Birth Order	Instrument: Distance, Birth Order
Dependent variable: GHQ-12						
Log HH income pc	0.078*** (0.021)	0.337*** (0.089)	0.219*** (0.068)	0.199** (0.084)	0.197** (0.084)	0.015*** (0.004)
County mean Log HH income pc	-0.199*** (0.048)	-0.784*** (0.217)	-0.541*** (0.175)	-0.778*** (0.219)	-0.741*** (0.217)	-0.037** (0.016)
Log remittances pc	0.016 (0.016)	0.086 (0.070)	0.097* (0.056)	-0.073 (0.066)	-0.079 (0.066)	0.012 (0.008)
County mean Log remittances pc	0.204*** (0.041)	0.664*** (0.124)	0.619*** (0.147)	0.821*** (0.185)	0.822*** (0.186)	0.031** (0.015)
Rho (correlation between equations)				0.106* (0.061)	0.108* (0.062)	
R-Squared	0.045	0.239	0.437			0.235
Observations	11624	11624	12174	16222	16156	11542

Source: RUMiC 2008. Notes: Models are estimated using OLS. Income inequality is measured using the GINI coefficient. See Table 2 for the full specification. \*/\*\*/\*\* indicate significance at the 10%, 5%, 1% level. Standard errors are in parentheses. GHQ-12 index obtained by summing the 12 answers of the General Health Questionnaire (GHQ). GHQ-11 refers to the index obtained by summing the answers of the General Health Questionnaire (GHQ) except the question referring to happiness.