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RURAL CHINA**

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Abstract. A national household survey for 2002, containing a specially designed module on subjective well-being, is used to estimate pioneering happiness functions in rural China. The variables predicted by economic theory to be important for happiness are relatively unimportant. The analysis suggests that we need to draw on psychology and sociology if we are to understand. Rural China is not a hotbed of dissatisfaction with life, possibly because most people are found to confine their reference groups to the village. Relative income within the village and relative income over time, both in the past and expected in the future, are shown to influence happiness. ‘Subjective well-being poverty’ functions are estimated, in which income and various proxies for ‘capabilities’ and ‘functionings’ appear as arguments. Even amidst the poverty of rural China, social functionings, attitudes and expectations are important to subjective well-being.

Key words. Happiness; subjective well-being; aspirations; relative deprivation; reference groups; poverty; China

JEL numbers. I 31

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1. Introduction

Why do rural-dwellers in China appear to be relatively happy despite their poverty and lowly socioeconomic status? That is the basic question which we pose in this paper. The Chinese economy is characterised by a remarkable rural-urban divide (Knight and Song, 1999). It takes the form of a great rural-urban disparity in mean incomes and in the provision of such services as education, health and pensions. Despite the economic reforms and the marketisation of the economy - forces which tended to break down the invisible 'Great Wall' between rural and urban China - the ratio of mean incomes has risen, and in 2002 reached a peak of 3.2 to 1. Rural incomes have risen rapidly in real terms in recent years (for instance, by 5.4 per cent per annum between 1990 and 2002), and rural income poverty has been sharply reduced. Nevertheless, the faster growth of urban incomes (by 7.5 per cent per annum over the same period) and the extension of peasant horizons through the media and increased temporary migration may have generated a sense of relative deprivation among rural people.¹ Yet, as we shall see, over 60% of rural people report themselves to be 'happy' or 'very happy'. We propose to explore the determinants of subjective well-being in rural China

The analysis of 'subjective well-being', also referred to as 'satisfaction with life' or 'happiness', is a relatively new but rapidly growing topic for economists. Literature surveys have begun to appear, including Frey and Stutzer (2002, 2003) and Layard (2003, 2005). Although economists normally regard perceptions as suspect and want agents' preferences to be revealed by actions rather than to be reported, the literature surveys are upbeat and optimistic. Thus Frey and Stutzer (2002: 431) conclude that '...happiness research is not a futile or eccentric activity but rather can provide relevant new insights ...' and, according to Layard (2003) '...the scientific study of happiness is only just beginning. It should become a central topic in social science.' Very little of the economic research on subjective well-being has so far been on poor countries. The exceptions include Ravallion and Lokshin (2001, 2002) on Russia, Kingdon and Knight (2006, 2007) on South Africa, and Graham and Pettinato (2002) on Peru and Russia. We are not aware of research on subjective well-being in rural China. There is thus great scope for advancing knowledge.

¹ The statistics above are derived from PRC, NBS 2004: 323, 355; PRC, NBS: 324.

The paper is arranged as follows. Section 2 briefly describes the rural survey and the variables to be used. It also provides some descriptive evidence, so defining the parameters within which to develop the hypotheses. Section 3 sets out the main questions to be asked and hypotheses to be tested. Section 4 presents the empirical results. Section 5 develops the notion of ‘subjective well-being poverty’ and compares it with other measures of poverty. Section 6 draws specific and general conclusions.

2. Data and methods

Our opportunity is provided by the 2002 national household survey organised by the Institute of Economics, Chinese Academy of Social sciences (IE, CASS) for the research programme on income distribution in China, involving IE, CASS and foreign scholars including two of the authors. Any economic analysis of subjective well-being requires detailed socio-economic information on households and their individual members, as well as specific well-being questions. The extensive rural household questionnaire contains a subjective well-being module, designed by the authors, which was intended to improve on the questionnaires currently used in well-being research and had specific hypotheses in mind.

The rural sample of the 2002 national household survey is drawn from a representative sub-sample of the National Bureau of Statistics (NBS) nationally representative sample for its annual national household survey. Our sample covers 22 provinces. Within each province on average 5.5 counties are sampled, and within each county on average 7.9 villages, each containing 10 observation households. In addition to taking information directly from the logbooks for each house compiled by the NBS, further information was gathered for each household, using the usual NBS interviewers.

We provide some descriptive statistics on subjective well-being which will help us to formulate the hypotheses to be tested. About 9,200 households responded to the subjective well-being questions.² There are at least three possible measures of subjective well-being in the data set, varying according to the extent to which their context is an economic one: happiness, satisfaction

² The household head or its main member present was asked the questions; the respondent is identified.

with living conditions, and satisfaction with household income. The three measures are compared in Knight and Gunatilaka (2007). Here we concentrate on the measure most generally used in the literature – normally referred to as happiness or satisfaction with life. The distribution of responses is shown in Table 1. The proportion of respondents opting for the highest two of five possible levels of subjective well-being is no less than 62 % and the proportion reporting the lowest two only 9 %. Rural China does not appear to be hotbed of dissatisfaction with life.

There is variation across the quintiles of income per capita: whereas 49 % in the lowest quintile are happy or very happy, the figure for the highest quintile is 73 %, and the corresponding proportions in the cases of those unhappy or not happy at all are 16 and 4 % respectively. When the categories of happiness are converted into cardinal values (ranging from a score of 4 for very happy down to 0 for not at all happy), the mean score (2.67 for the sample as a whole) rises monotonically from 2.41 in the lowest to 2.89 in the highest quintile. However, the standard deviation of the score (0.87) is large in relation to the mean, and much greater than the range of quintile scores (0.48). There is much more to subjective well-being than absolute household income per capita.

In contrast to this result, we also find that income is important to those who rate their subjective well-being low. Respondents reporting being unhappy or not at all happy were asked the reason. Table 2 shows that low income was their predominant concern, accounting for 64 % of cases. A possible solution to this apparent contradiction is that relative income is important for subjective well-being. People might compare themselves, or their income, either with themselves in the past or with ‘relevant others’, i.e. their social reference groups.

Respondents were asked to compare their current living standard with their standard five years ago. Table 3 shows that 61 % of them now had a higher living standard and that only 5 % had become worse off. It also shows that, among those currently better off, 72 % were happy or very happy, among those at the same level the corresponding figure was 47 %, and among those worse off it was 36 %. The mean happiness scores were 2.88, 2.39, and 2.09 respectively. People apparently feel relative deprivation by comparison with their past.

Respondents were also classified according to their answers to the question: is your current living standard much below average, below average, average, above average, or much above average for your village? Table 4 shows a symmetrical distribution around the average, but with the majority (57 %) regarding their living standard as being average. The proportion reporting that they are happy or very happy rises monotonically with relative living standard, from 18 % in the lowest category to 83 % in the highest. The mean happiness score also rises monotonically, from 1.50 to 3.16. It appears that people experience relative deprivation by comparison with others in their village.

It is an innovation of this data set that interviewees were asked about the people with whom they made comparisons. Table 5 presents the proportions reporting each possible main comparator group, and shows how this varies by level of happiness. Most respondents (68 %) make comparisons with their neighbours or fellow-villagers; a mere 11 % have their main orbit of comparison beyond the village. There is only a weak association with reported level of happiness. However, whereas 40 % of the very happy compare with their neighbours or relatives, only 19 % of the very unhappy do so; the corresponding figures for fellow-villagers are 37 and 52 % respectively, and for comparisons beyond the village 11 and 15 % respectively. Wider orbits of comparison are associated with unhappiness.

Our basic method is to estimate subjective well-being (that is, happiness) functions, either of the form

$$W_i = a + \mathbf{X}_i \mathbf{b} + u_i \quad (1)$$

where W_i is a cardinal measure of well-being and \mathbf{X}_i is a vector of explanatory variables, or of the form

$$W_i^* = a + \mathbf{X}_i \mathbf{b} + u_i \quad (2)$$

where W_i^* is a latent variable and what is observed is different categories of an ordered categorical variable. Eq. (1) is estimated by OLS and eq. (2) using an ordered probit estimator.

In a methodological paper, Ferrer-I-Carbonnel and Frijters (2004) examine the robustness of the literature findings on the determinants of happiness. There are two main issues: whether to treat reported happiness levels as cardinal (as psychologists generally do) or ordinal (as economists

generally do); and the influence of the unobserved determinants of happiness. The former issue boils down to whether it is possible to use OLS regression methods (if cardinal) or necessary to use latent variable methods (if ordinal). The latter issue can be dealt with by using panel data, so eliminating the influence of unobserved time-invariant individual fixed effects. The two issues are related, however, because the estimation of ordered probits when standardising for fixed effects yields inconsistent estimates (Maddala, 1983).

Using a particular household survey (the German national panel), the authors find that the results are not sensitive to the choice between OLS and latent variable methods. However, they are sensitive to standardisation for individual fixed effects in this data set which lacks variables representing personality traits. For example, standardisation tends to reduce the size of the positive coefficients on income, health, and marriage. The general implications are that having a personality which is conducive to happiness is also associated with having high income, being healthy, and being married; and that reliable research results require either a panel data set, or good instruments for the endogenous variables, or explanatory variables that measure the effects of personality traits. The specific implications for this paper, given that we lack panel information on happiness over time, are that we should attempt to include variables that proxy personality traits, and that we should attempt to instrument the worrisome variables, in particular income.

3. Questions and hypotheses

The descriptive results of Section 2 and evidence from the happiness literature provide the best compass in these uncharted waters. The main findings from the general literature on the estimation of happiness functions are as follows. First, happiness increases with absolute income, *ceteris paribus* (Frey and Stutzer, 2002). Moreover, differences in income explain only a small proportion of the variation in happiness among people. Cross-country studies suggest that the relationship between income and happiness becomes weaker as income per capita rises. This is consistent with the argument that happiness depends in part on the gratification of certain basic biological needs and in part on the gratification of various social needs that are moulded by society.

The limited role of absolute income is further suggested by the fact that income and happiness are positively related in cross-section but not in time-series studies. For instance, in the United States and Japan, real income per capita increased over time but the mean happiness score remained constant. It is possible that mean happiness failed to rise over time because aspiration levels adjusted to, and so rose along with, mean incomes in the society, and happiness varied positively with income and negatively with aspirations (Easterlin, 1974, 2001). A variant on the notion that relative income influences happiness stems from the long established literature on relative deprivation. People feel deprived if they are doing less well than their comparators. A person's position in the income distribution of the relevant reference group may thus govern happiness. This raises the questions: what comparisons do people make; how wide are the orbits of comparison? Duesenberry (1949) stressed own previous income or consumption as the frame of reference. Runciman (1966) suggested informational and social reasons why the frame of reference can be narrow. The second main finding, therefore, is that happiness depends on relative income, defined by the reference group or the reference time that people have in mind. However, it is not necessarily the case that the income of the reference group has a negative effect on happiness. Knight and Kingdon (2007) find a positive effect for the income per capita of the small local residential community that, after tests, they interpret as the result of altruism, fellow-feeling and a sense of community.

Absolute and relative income are not the only determinants of happiness. Being unemployed is found to reduce happiness independently of its effects on income (Clark and Oswald, 1994; Winkelmann and Winkelmann, 1998). The general unemployment rate also has a depressing effect, suggesting that having a higher risk of becoming unemployed, reflecting economic insecurity, reduces happiness. Subjective well-being is also influenced by several factors that are non-economic or potentially so, such as age, sex, marital status, health status, education, social capital, religion, and social and political institutions (Helliwell, 2002).

Drawing on the literature and on the descriptive evidence of the survey, we pose the following questions. First, do the personal characteristics that are found to influence happiness around the world have the same effects in China? Second, do the variables predicted by economic theory to govern happiness – such as income, wealth and hours of work – behave as expected? Third, are

comparative concepts – such as income relative to others in the village or to other times – important to happiness, and if so what roles are played by reference groups and by aspirations? Fourth, do variables relating to the community – such as public services, the ‘social wage’, and the environment – play their expected role? Fifth, do attitudes have an independent effect on happiness? Sixth, can ‘subjective well-being poverty’ serve as an encompassing notion of poverty, to be explained by two other criteria for poverty: income, and the ‘capabilities’ to be and to do things of intrinsic worth? The answers to these questions will be related to three underlying issues. One: how can the generally high levels of reported happiness be explained? Two: are the changes that are occurring in rural society likely to raise or lower happiness? Three: does the analysis carry policy implications?

4. Happiness functions

Table 6 presents OLS equations estimating the determinants of happiness. The first column provides mean values, eqs. 1 and 2 show the basic equation containing some of the variables that are commonly used in happiness functions, and eqs. 3 and 4 show the full equation which was arrived at by a process of experimentation to establish which of the potentially interesting variables have robustly significant coefficients. Eqs. 2 and 4 contain a set of province dummy variables, so showing the relationships that hold within provinces. We examine the determinants of happiness under five headings: basic variables, conventional economic variables, comparison variables, community variables, and attitudinal variables. Although imperfect, this categorization helps us to develop a systematic argument. The strength and plausibility of many of the estimated relationships bolsters our confidence in the methodology.

The discussion of Table 6 is supplemented by drawing on Tables 7, 8 and 9. These show the results obtained by estimating the same full equations (corresponding to eq. 3) for sub-samples: the different household, and the different province, income per capita terciles in Table 7; separately for men and women in Table 8; and for those whose reference group is within and beyond the village in Table 9. We report only the variables for which there are notable sub-sample differences in their coefficients that are used in the discussion. These sub-sample results are either interesting in their own right or because they assist the interpretation of the results of Table 6.

4.1 Basic variables

We begin with some basic variables that appear in almost all happiness functions around the world. Both age (negative) and age squared (positive) have generally significant coefficients. The implied U-shaped relationship of happiness with age has its lowest point in the age-range 30 (eq.1) to 38 (eq. 4). Men report lower happiness than women. With single status as the reference category, marriage is relatively blissful in rural China, although the coefficient is not significantly positive in the full equations; by contrast, divorce and widowhood reduce happiness. It is interesting that the coefficients on divorce and widowhood are largest for the poorest tercile of households, and only in this tercile are the coefficients significant (Table 7). The good health of the respondent raises happiness substantially: even when a full set of explanatory variables is included, having good health (rather than health that is reported to be so-so or poor) raises the score by 0.27 points. These results for age, gender, marital status and health are found in almost all happiness studies, and this gives our study credence.

The significantly positive effect of education in the basic equation is not robust to the addition of other variables, in particular the attitudinal variables. This suggests that education has its independent effect by moulding attitudes; of course, it also has an indirect effect by raising income. The dummy variable denoting that a person is from an ethnic minority is significantly positive. We have a variable denoting the current mood of the respondent. Being in a good (instead of a normal or worse than normal) mood has a large positive effect, of at least 0.35 points. Other happiness studies do not condition on mood: its effect then has to be picked up as noise in the error term.

4.2 Conventional economic variables

Ln income per capita has a significantly positive effect on happiness in every equation, although the effect is weakened when the full set of variables, including the comparison variables, is included. In the basic equation, a doubling of income per capita raises the happiness score by 0.13 points, and the effect is still weaker in the other equations. It is interesting that the coefficient is significantly positive only for men (Table 8): men appear to be more materialistic than women. Testing the hypothesis that additional income contributes less to happiness as

income rises, we looked for a non-linear relationship by adding the square of the income variable. However, in no case was the coefficient on the squared term significantly different from zero (equations not shown).

Net financial assets also raise happiness significantly, but only a little. However, their effect is greatest, and most significant, in the lowest income per capita tercile of both households and provinces, suggesting that they are most valued in conditions of poverty. As expected, the number of hours worked enters with a significantly negative coefficient. However, the coefficient is most negative for the poorest tercile of households, and only in this tercile is it significantly different from zero. Open unemployment – not a common state in rural China – is negative in its effect but generally not significantly so. None of the conventional economic variables is important in the determination of happiness.

4.3 Comparison variables

We introduce various forms of income comparison, both temporal and spatial, to consider whether happiness is influenced by peoples' aspirations, as set by their reference groups. Respondents were asked to compare their household income with that of other households in the village. The effect on happiness is in all cases not only statistically significant but also powerful and monotonic. For instance, in eq. 3 we see that having income 'much above average' increases the happiness score by 0.21, and 'above average' by 0.11; having income 'below average' decreases the score by 0.27 and 'much below average' by 0.80. In particular it is the poor of the village who suffer as a result of making intra-village comparisons. Given that household income per capita is already being controlled for, and that villages differ greatly in their average income (the coefficient of variation of village mean income being 57 per cent), these results imply a relative income effect rather than an absolute income effect. They suggest that the poor households of the village, in particular, experience relative deprivation. There is a narrower range of coefficients for those with extra-village (0.95) than for those with intra-village (1.06) reference groups (Table 9): relative income within the village is less important for the former group.

Easterlin (2001) has argued that happiness is a positive function of income and a negative

function of aspirations. Moreover, aspirations tend to be governed by the standards and norms of the community. This makes a person's relative position in the community important to his or her happiness. Thus, aspirations adjust to the income of the community, so creating a 'hedonic treadmill' which makes happiness insensitive to absolute income while being sensitive to relative income. Our estimated coefficients on the absolute and relative income variables are consistent with this interpretation.

Compared with those whose living standards have not altered over the last five years, those who report an increase have a rise in happiness score, *ceteris paribus*, of 0.20, and those who report a decrease have a fall of 0.15 points. Although the effect of an improvement in living standards is uniform across the income terciles, the effect on happiness of a deterioration is worst for the poorest tercile of households, and also of provinces (Table 7). A worsening of living standards is most difficult to bear in conditions of poverty. Similarly, compared with static expectations, those who expect a big increase over the next five years have a rise in score of 0.20, those who expect a small increase a rise of 0.11, and those who expect a decrease a fall of 0.09 points. Averaging the four coefficients, the mean for those with their reference group beyond the village is -0.07, but for those with their reference group within the village it is +0.09 (Table 9). The contrast is consistent with the former's aspirations having been raised, relative to their current income, by the higher income of their wider reference group. In summary, the results provide some support for the argument that peoples' happiness is sensitive to past or expected future improvement or deterioration in their income, whatever their current income level.

Our evidence on the effects of non-current income is consistent with some research results in social psychology. It is found that people tend to evaluate their past, current and future income by reference to their current aspirations: it is easier for people to recall or project their income than to recall or project their aspirations (Easterlin, 2001, Kahneman and Snell, 1992, Rabin, 1998). It is also possible that people, in considering their past, or their future, income, do not consider the changes in the income of their reference groups that accompanied these changes, or are likely to do so. Through either of these mechanisms, happiness is made more sensitive to income at another time than it is to current income. It is true that our results with regard to future income are consistent with a conventional economic interpretation in terms of inter-temporal

utility maximization, i.e. happiness is positively related to ‘permanent income’ which is a positive function of expected future income. However, the results for past income cannot bear such an interpretation insofar as low income five years ago reduces permanent income.

It is interesting that the happiness scores of women are less sensitive to having household income much above the village average but more sensitive to expecting a big increase in income over the next five years (Table 8). There appears to be some gender difference in the way in which aspirations are formed. Men might set their aspirations competitively, basing them more in relation to other people, whereas women might set their aspirations internally, basing them more in relation to other times.

We introduced a dummy variable denoting that the respondent had lived outside the township for at least a year. Such an experience – often involving rural-urban migration – was likely to broaden a person’s reference group, and the broader reference group would probably have higher income and living standards than were to be found in the village or township. The hypothesis is therefore that migration raises aspirations, and so the dummy variable has a negative sign. The coefficient is indeed negative in both eqs.3 and 4, but not significantly so. However, in the equation with income instrumented (Table 11), and again in the probit equations (Table 10), the coefficient is consistently negative and significant. The comparison of those with reference groups within and beyond the village provides clarification: the coefficient is significantly negative only for those whose horizons have indeed been widened (Table 10).

One comparator variable produced a surprising result. Although we know that most people have their reference group within the village, we were curious to discover whether a greater degree of income inequality in the county (having an average population of about half a million people) would reduce happiness. However, because the average sample size (about 80 households) is probably too low accurately to represent inequality within a county, we were prepared for an insignificant result. We were not prepared for the positive and significant effect of the county Gini coefficient reported in eq. 3. Although the within-province estimate is much smaller and not significant (eq. 4), the result deserves an attempt at explanation. High income inequality within a county need not give rise not to feelings of relative deprivation – people’s orbits of comparison

are too narrow for that. Instead, higher inequality might serve as a proxy for greater diversification in the county, in turn raising the prospect of greater opportunities for economic benefit. This ‘demonstration effect’ can occur at the individual level (e.g. by offering employment possibilities) or at the village level (e.g. knowledge that other villages have launched themselves into successful development can raise expectations of the successful development of one’s own village). Hirschman’s analogy of two lanes of cars stuck in a tunnel describes this phenomenon well (Hirschman, 1973). The effect appears to be most powerful in the poorest third of provinces (Table 8) and more powerful for men than for women (Table 8). The coefficient is twice as high for those whose reference group is beyond the village than for those whose reference group is within it (Table 9): those with wider horizons experience a stronger demonstration effect.

4.4 *Community variables*

When a full set of province dummies is introduced, with Beijing as the omitted category (eq. 4), several of the coefficients are extremely large. Only Hebei, Liaoning, Shandong and Xinjiang have happiness scores that are not significantly different from Beijing’s. All the others have significantly lower happiness, with Guanxi, Yunnan, Shaanxi and Guangdong doing worst. These differences are to some extent related to province income, because the coefficient on province mean rural income per capita - replacing the province dummies of eq.4 (equation not reported) is 0.12, significant at the one per cent level. The coefficient is largest for the poorest third of households and of provinces, and lowest for the richest third (Table 7). The positive association might reflect the extent of government funding of public services and infrastructure for rural people, in which the poorest households and households in the poorest provinces gain most. Nevertheless, one may ask whether there are other, unobserved, province characteristics, such as environment, culture, and quality of governance, which also help to explain these province differences.

Certain variables which do, or might, contain a public goods or a social wage element were found to have significant coefficients with the expected sign. These include the possession of a phone, the expression of satisfaction with the village clinic, and the view that its spokesman represents the interests of the village. The first two variables have their strongest effect in the

poorest third of provinces, and the last variable in the poorest third of households: communication, health care and effective voice appear to be particularly important for the well-being of the poor (Table 7). It is notable that for women the coefficient on possession of a phone is 2.3 times that for men (Table 8). Some community variables are significant only in the equation (eq. 3) which does not introduce province fixed effects: there is a tendency for people in larger villages, and for those living in hilly, and especially mountainous, terrain to be less happy.

4.5 *Attitudinal variables*

We introduced a set of attitudinal variables into our full equations. While recognizing that attitudes might be endogenous - to be explained by characteristics both observed and unobservable by the researcher - we see them as a way of exploring otherwise hidden aspects of the personality. Each of the variables is created as a score on the basis of the strength of agreement with the relevant statement. Our proxies for the quality of personal relationships – the reported degree of harmony within the lineage, and within the village, both have a significantly positive effect. Similarly, the views that friends are important, and that family is important, also have a significantly positive effect in at least one equation. Our proxy for the degree of personal materialism – the strength of agreement with the view that money is important – has a significantly negative coefficient in the equation without province fixed effects. However, this effect is concentrated in the poorest third of provinces (Table 7): perhaps materialism hurts more in a poor community. Moreover, consistent with the greater happiness that men derive from income, it is more negative for men than for women and only significant in the case of men (Table 8). People who derive their satisfaction with life more from personal relationships and less from material goods and services appear, *ceteris paribus*, to be happier.

4. Robustness tests

In this section we report tests of the robustness of our results; we do so briefly as our story remains intact. Table 10 sets out binary probit, instrumented probit, and ordered probit estimates, and Table 11 instruments income in the happiness score equations. In Table 10, the marginals for the binary probit equations show the effect of each variable on the probability of being happy or very happy. Those for the ordered probit equation show the effect on the probability of being unhappy or not at all happy, or of being happy or very happy, rather than so-so. By comparison

with the happiness score equations of Table 6, there are almost no differences in sign, and very few in significance. Overall, our results are robust to the form of the dependent variable.

The exclusion restrictions used for instrumenting income in Table 11 are father's years of education and the value of productive assets, neither of which is likely to influence happiness directly.³ As the table shows, the instruments are relevant in both equations (the test of excluding instruments has $P < 0.01$) and valid in the full equation (the test for identification of all instruments has $P > 0.10$), but the test of joint significance of the endogenous regressors in the main equation implies that instrumenting is not necessary ($P > 0.10$). Comparing the results of the OLS equations in Table 6 and the results with income instrumented in Table 11, we see almost no notable differences in the coefficients apart for that on the income variable. In the OLS case, it is consistently positive and significant, averaging 0.17 in the basic equation and 0.06 in the full equation. With income instrumented, the coefficient is a significant 0.58 in the basic equation but not at all significant in the full equation. Similarly, in the binary probit equations of Table 10, the effect of instrumenting is to raise the marginal on income; and this is true of both the basic and the full equations.⁴

We expected the income coefficient in the OLS equation to be biased upwards: happiness might itself make workers more productive, or unobserved characteristics such as friendliness or ability might raise both income and happiness. The increase in the instrumented basic equation implies that there are characteristics, such as workaholicism, which increase income but decrease happiness, or that instrumenting corrects for error in the measurement of income, so reducing downward attenuation bias. On the assumption that the instrumented income coefficient is reliable, a doubling of income in the basic equation of Table 11 raises the happiness score by only 0.40. The marginal on instrumented income in the basic equation of the binary probit (Table 10) shows absolute income at its most powerful: a doubling of income would raise the probability of being happy or very happy by 85 percentage points. Apart from this one case, our conclusion that absolute income is not important for happiness remains true.

³ Productive assets exclude financial assets and land, both of which might raise happiness by providing a sense of security.

⁴ The excluding restrictions are significant ($P < 0.05$) in the first stage equation (relevance), the test for overidentification of the instruments (validity) is passed ($P > 0.09$), but the test of exogeneity indicates that we

5. Subjective well-being poverty

Can subjective well-being be used as a measure of poverty? The normal measure of poverty is defined by a minimum income or consumption level. Sen (1983) introduced the concept of ‘capabilities’ poverty. This he defined as not possessing adequate resources to have the capabilities to achieve a specified set of ‘functionings’, i.e. the capability to be and to do things of intrinsic worth. Absolute deprivation in terms of a person’s capabilities can imply relative deprivation in terms of income, e.g. for taking a full part in the life of the community. Thus, Sen eschewed the ‘welfarist’ approach to poverty with its underlying assumption that the evaluative criterion is the utility that people derive from goods and services, arguing that it represents a particular mental reaction to the use of a capability rather than the capability itself: ‘The underdog learns to bear the burden so well that he or she overlooks the burden itself. Discontent is replaced by acceptance, suffering and anger by cheerful endurance.’ (Sen, 1984: 308-9).

We intend nevertheless to explore the happiness approach to poverty. We do so because, in a liberal and democratic spirit, we place a value on individuals’ own valuation of their welfare, and because the objective of alleviating subjectively felt misery and raising peoples’ well-being is a commonly held value judgement, which underlies much of the concern that is voiced about poverty in developing countries. It is possible to incorporate the alternative approaches to poverty within the framework of happiness functions. Not only income but also various proxies for possession of capabilities can be included among the explanatory variables. By this means subjective well-being can play an encompassing role, and one which can generate weights showing the relative importance of various components of poverty (Kingdon and Knight, 2006).

Table 12 shows the relationships between subjective well-being poverty and income poverty. 9.0 % of the sample is in subjective well-being poverty, defined as being classified as unhappy or not at all happy. Defining the income-poor as constituting the same proportion of households as are classified subjective well-being-poor, we find that only 17.8 % of the income-poor are also subjective well-being poor: it is easy to avoid unhappiness despite low income. It follows by definition that 17.8 % of the subjective well-being poor is income-poor: it is also possible to be

cannot reject the exogeneity of income ($P > 0.10$) in the full equation.

unhappy without having low income. On that basis, only 1.6 % of households are poor by both definitions.

Defining the income-poor as the poorest 20 % of households in terms of income per capita, 15.9% of this group is also subjective well-being-poor. Now, 3.2 % of households are poor by both definitions. When we extend the income poverty definition to the poorest third of households, 14.3 % of this group is subjective well-being-poor. Still only 4.8 % of households are poor on both counts. We obtain very different views of the poor from our two notions and measures of poverty. The choice between them depends on a value judgement.

Let us make the value judgement that subjective well-being poverty should be the focus of policy concern. For policy purposes we need to know the relative contributions that various policy-relevant characteristics can make to the reduction of subjective well-being poverty. We estimate a binary probit model in which the dependent variable is being in subjective well-being poverty, i.e. being unhappy or not at all happy. We treat subjective well-being poverty as a concept which encompasses both income-poverty and capabilities-poverty, by making income and various capabilities, or functionings, arguments in the unhappiness function. The marginals in the probit equation then provide a set of weights that enter into subjective well-being poverty and indicate the potential of each characteristic for engineering the escape from this notion of poverty.

Table 13 presents the estimations. Marginal effects are reported, with the accompanying asterisks indicating the statistical significance of the coefficients on which they are based. Since we are now predicting poverty, the signs on the variables are reversed by comparison with the happiness functions. Eq. 1 has only the basic variables: the importance of conditioning on current mood is seen again. Eq. 2 then adds the conventional economic variables, eqs. 3 and 4 add instead the physical functioning variables and the social functioning variables respectively, and eq. 5 contains all variables – basic, conventional economic variables, and the capabilities variables, comprising both physical and social functionings. The conventional economic variables have the expected signs, although none is significant in the final equation. Among the physical functionings, being in good health, being satisfied with the village clinic, and feeling that the village spokesman represents one's interests are all relevant for reducing subjective well-being

poverty. Of crucial importance among the social functionings is relative income within the village. We see that concentration only on absolute income and wealth levels would ignore some important determinants of unhappiness.

6. Concluding comments

Being probably the first study of subjective well-being in rural China, the paper provides a good deal of descriptive information that is itself interesting. In addition it tests various hypotheses which emerge from that information and from the general literature on subjective well-being. Despite the fact that rural-dwellers have relatively low incomes and have been left behind in China's economic development, it appears that rural China is not a hotbed of dissatisfaction with life. Nevertheless, there is much variation in happiness scores which can be well explained by the variables in the survey.

We answer the six questions posed in Section 3. First, the data set displays regularities that are common to many happiness studies around the world. For instance, the age-happiness profile has a U-shaped pattern, and being female, being married, and being in good health all raise happiness. However, there is no clear-cut direct beneficial effect of education on happiness once other variables, such as attitudes, are included in the regression. Second, the conventional economic variables raise happiness, in line with basic economic theory, but the contributions of the absolute levels of income and financial wealth are weak, especially when the full set of explanatory variables is included.

Third, a possible reason for this result is that happiness is not only a positive function of income but also a negative function of aspirations, and that the latter can be governed by the income of the reference group. The reference group is likely to be determined by information sets and by social interactions. We found that most rural people confine their reference groups to the village: their orbits of comparison are narrow. The estimates show happiness to be highly sensitive to respondents' perceptions of their households' position in the village income distribution. Thus, a rise or fall in household income tends to be offset by any simultaneous rise or fall in village income. By contrast, income inequality in the county – which is found to raise happiness – appears to serve as a 'demonstration effect' of possible progress in the future. We found that

respondents also make comparisons with the position of their households in the past and in the future. Happiness is boosted if income has risen over the past five years and if income is expected to rise over the next five years; and it is depressed by past or expected future deterioration in income. The sensitivity of happiness to expected future changes in income suggests that people fail to foresee how their aspirations will adjust to changes in their income, possibly because they do not consider how the income of the village will change. The sensitivity of happiness to past changes in income suggests either that people judge their past income by their current aspirations or because household income that has changed a lot has changed relative to the mean household income of the village.

Fourth, community variables also play a role in determining individual happiness. There are important province differences in happiness, *ceteris paribus*. These are positively related to province mean rural income per capita - which might reflect the extent of government funding of public services and infrastructure for rural people. We found some evidence of a public goods or 'social wage' element: among the various proxies that we investigated, possession of a phone, satisfaction with the village clinic, and the view that its spokesmen represent the interests of the village each raise happiness. Fifth, attitudes are also associated with happiness score. Our proxies for the quality of, and importance attached to, personal relationships tended to raise happiness and our measure of the degree of personal materialism tended to lower it. Thus, people who derive their satisfaction with life more from personal relationships and less from material goods and services appear to be happier.

Sixth, there is only a weak association between subjective well-being poverty and income poverty. To illustrate, we made a value judgement in favour of the concept of subjective well-being poverty – comprising the households reporting that they are unhappy or not at all happy – as the proper focus of policy concern. We treated it as an encompassing concept, to be explained in terms of both income poverty and indicators of 'capabilities' poverty, with the estimated coefficients in the unhappiness function indicating their relative importance. The conventional economic variables had the expected sign in the equation predicting subjective well-being poverty but were not significant. Three variables representing physical functioning were significant, and among the social functionings relative income within the village was crucial. The

exercise highlighted the limitations of thinking only in terms of income poverty, and it provided a way of identifying, combining, and evaluating the possible dimensions of capabilities poverty.

Consider the three issues which underlie our analysis: the puzzle that we started with, and the implications for the future and for policy. The basic reasons why most rural-dwellers are happy despite their relative income poverty and low socio-economic status are that they have limited information sets and narrow reference groups, their own income has risen in recent years and they expect it to rise in the future, and they place a high value on personal and community relationships. This solution to the puzzle has implications for the likelihood of social unrest and political protest in rural China. Of course even a low happiness score might be a poor indicator of the feelings that stir up social unrest: such feelings might require that people perceive an unsatisfactory situation to man-made and remedial. Han and Whyte (2006) have examined the likelihood of discontent by means of a 2004 survey that gauged the strength of feelings of distributive injustice in Chinese society. Their questionnaire derived measures in four dimensions - feelings that economic inequality is unfair, that there is a lack of economic opportunity, that government should reduce income inequality, and that there is social injustice. Their regression analysis of the determinants of each of the four scores included a set of economic activities, four rural and five urban. In each case, by comparison with urban workers, rural people, and particularly farmers, were found to have lesser feelings of distributive injustice. The authors' explanation is consistent with our own analysis. It is that people make judgements about their situation on the basis of their reference groups, and that rural people have narrow, local reference groups. Whereas the poverty of this disadvantaged group by comparison with the wider society might well be considered unjust, rural people feel little distributive injustice within their local society.

How will happiness alter as rural society evolves? Rising income should increase happiness, albeit not to any great extent. The low coefficient on current income in the happiness functions suggests the possibility of a 'hedonic treadmill' in which aspirations rise in response to rising incomes. Economic development might stimulate aspirations in other ways as well. We saw that the conditional effect of past migration from the village is to reduce the happiness of villagers, probably by broadening their reference groups. Contrary to our prediction, education on its own

does not advance happiness, probably because it raises aspirations relative to opportunities. Other socioeconomic changes that tend to integrate rural and urban society – such as improved communications, the spread of the media, and rising materialism – may have similar effects. Interestingly, it is possible that rising aspirations will in turn be the spur to greater economic activity and effort, so in due course raising rural incomes.

Turning to the policy implications of the analysis, the prescription that happiness scores should be raised involves a value judgement that some might contest (for instance, Sen, 1983, 1984). However, if we are willing to accept this objective as at least one of the criteria for policy-making, various suggestions can be offered. We see the primacy of policies to accelerate the growth of rural incomes: conditional on current income, current happiness is raised by both past and expected future income growth. The evidence shows the importance of certain local amenities, in particular the village clinic – which is not surprising in view of the observed importance of healthiness for happiness. The effective representation of villagers' interests is good for happiness, and this is probably best safeguarded by the encouragement of village democracy.

At the methodological level the paper has made four contributions. First, it suggests the importance of standardizing for the current mood of the respondent. Second, it shows that direct knowledge of the relevant reference group can be important for formulating hypotheses about subjective well-being and for interpreting results. Third, it confirms the conclusion of Ferrer I-Carbonell and Frijters (2004) that the substantive results of happiness functions are insensitive to whether the dependent variable takes a cardinal form (by being converted into a happiness score) or an ordinal form (by being treated as an ordered set of happiness levels). Fourth, there is indeed a danger that income is endogenous in the happiness function and that instrumenting (or use of panel data, or of proxies for personality traits) is needed in order to avoid estimation bias. However, the fact that, contrary to expectations, instrumenting consistently increased the coefficient on income suggests either that the personal characteristics which raise income also lower happiness, or that instrumenting corrects for the attenuation bias that arises when income is measured with error.

This is one of the few happiness studies for developing countries. There are powerful regularities in our happiness functions, and these bear plausible interpretations. The paper adds to the growing evidence that the variables predicted by economic theory to be important for happiness are relatively unimportant. It suggests that we need to draw on psychology and sociology if we are to understand. It takes a tiny step towards achieving the critical mass of evidence which might yet induce the paradigm shift required to make happiness studies part of mainstream economics.

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Table 1

Percentage of Respondents by Level of Happiness, Overall and by Income Quintile

	Overall	Income Quintile					
		1 st	2 nd	3 rd	4 th	5 th	5 th -1 st
<i>Happiness</i>							
very happy	15.7	10.5	12.6	15.5	19.4	20.4	10.0
happy	46.3	38.0	43.2	47.1	50.4	52.8	14.8
so-so	29.0	35.6	32.8	29.3	25.0	22.3	-13.3
not happy	8.0	13.7	9.8	7.6	4.9	4.2	-9.5
not at all happy	1.0	2.2	1.7	0.6	0.3	0.2	-2.0
total (number)	9072	1814	1814	1815	1814	1815	
mean happiness	2.67	2.41	2.55	2.69	2.84	2.89	0.48
standard deviation of happiness	0.87	0.93	0.89	0.84	0.80	0.78	

Note: Level of happiness based on cardinal values assigned to qualitative assessments as follows: very happy=4; happy=3; so-so=2; not happy=1 and not at all happy=0. Data for this table and for all subsequent tables are derived from the Rural Household Survey, 2002.

Table 2

Percentage of Respondents Giving Each Reason for Unhappiness

	Percentage
income too low	62.6
future is uncertain	4.9
in bad health	12.4
family conflict	5.1
personal problems	4.9
other problems	8.4
no answer	10.0
total (number)	831

Note: The analysis relates to respondents reporting that they are not happy or not at all happy.

Table 3

The Percentage of Respondents by Level of Happiness and by Comparison of Current Living Standard with that Five Years Ago

	Current Living Standard			
	better	the same	worse	don't know
very happy	20.3	7.7	9.1	10.0
happy	51.3	38.9	27.2	25.0
so-so	23.3	38.4	30.7	32.5
not happy	3.9	12.6	25.8	15.0
not at all happy	0.4	1.4	5.6	2.5
difficult to say	0.7	1.1	1.6	15.0
total (row percentage)	61.2	33.5	4.9	0.9
mean happiness	2.88	2.39	2.09	2.29

Note: The total number of observations is 9,195. The mean happiness score relates only to those who reported a happiness level.

Table 4

Percentage of Respondents by Level of Happiness and by Relative Living Standard

	Current Living Standard				
	much below average	below average	average	above average	much above average
very happy	2.64	6.12	16.35	23.83	33.54
happy	14.98	33.57	48.69	56.42	49.37
so-so	25.11	39.59	29.88	16.74	16.46
not happy	44.49	18.54	4.69	2.84	0.63
not at all happy	12.78	2.17	0.38	0.18	0.00
total (number)	227	1,796	5,200	1,691	158
mean happiness	1.50	2.23	2.76	3.01	3.16

Note: Respondents are classified according to the question: 'How does your living standard compare with the average for your village?'

Table 5

Percentage of Respondents Reporting Each Main Comparator Group

	Percentage
neighbours	28.62
relatives	7.02
people in the village	39.56
people in the township	3.76
people in the county	2.71
people in the city	3.48
all of China	0.93
no reference group	13.92

Table 6
Determinants of Happiness: OLS Regression Results

	Mean or proportion	(1)	(2)	(3)	(4)
<i>Basic variables</i>					
Age	45.41	-0.008881	-0.009465*	-0.017087***	-0.017150***
Age squared	2174.09	0.000151**	0.000146**	0.000236***	0.000227***
Male (sex)	0.74	-0.074868***	-0.053519***	-0.051687**	-0.039202*
Married	0.95	0.128023**	0.135524**	0.117619	0.109937
Divorced	0.00	-0.418571***	-0.426182***	-0.469785**	-0.504730**
Widowed	0.02	-0.261034***	-0.204656**	-0.184505*	-0.169143*
Ethnic minority dummy	0.12	0.103139***	0.057898*	0.113159**	0.093956*
Education (years)	7.12	0.006880**	0.003133	-0.003135	-0.00537
Unemployed	0.01	-0.046912	-0.102329	-0.068143	-0.124002*
In good health	0.74	0.412883***	0.384214***	0.277578***	0.272917***
In a good mood	0.65	0.553788***	0.525303***	0.367026***	0.353797***
<i>Absolute income variables</i>					
Log of per capita household income 2002 (Yuan)	7.68	0.186826***	0.157300***	0.064111***	0.054241***
Net financial assets ('000 Yuan)	5.87	0.003019***	0.001516**	0.001696**	0.000941
Working hours ('00 per year)	40.17	-0.001531***	-0.001022***	-0.000923**	-0.000729*
<i>Comparison variables</i>					
Lived outside township for at least a year	0.13			-0.043074	-0.023673
Household income much above village average	0.02			0.206399***	0.199980***
Household income above village average	0.19			0.108489***	0.126938***
Household income below village average	0.20			-0.265171***	-0.257048***
Household income much below village average	0.03			-0.804482***	-0.790204***
Current living standards better than five years ago	0.61			0.196725***	0.208358***
Current living standards worse than five years ago	0.05			-0.149633***	-0.143282***
Expect big increase in income over next five years	0.10			0.202574***	0.199917***
Expect small increase in income over next five years	0.68			0.105739***	0.106299***

Expect decrease in income over next five years	0.04		-0.094135*	-0.087334*
Gini Coefficient at county level	0.28		0.855882***	0.280132
<i>Community variables</i>				
Phone	0.42		0.081348***	0.064223***
Satisfaction with clinic	2.35		0.055787***	0.049629***
Extent to which spokesman represents interests	2.54		0.037442***	0.030212**
Total village population at end 2002 ('00s)	18.28		-0.004169***	-0.000662
Hilly terrain	0.31		-0.072281**	0.004892
Mountainous terrain	0.22		-0.216722***	-0.100594**
Anhui	0.05	-0.288803***		-0.287784**
Chongqing	0.02	-0.410842***		-0.403608***
Gansu	0.03	-0.483579***		-0.407857***
Guangdong	0.06	-0.515887***		-0.397570***
Guangxi	0.04	-0.825426***		-0.733953***
Guizhou	0.04	-0.492319***		-0.405541***
Hebei	0.04	-0.184516**		-0.224850**
Henan	0.06	-0.216806***		-0.203190*
Hubei	0.06	-0.343530***		-0.315209***
Hunan	0.05	-0.468748***		-0.453602***
Jiangsu	0.05	-0.276957***		-0.279254**
Jiangxi	0.05	-0.481965***		-0.431292***
Jilin	0.05	-0.274663***		-0.311764***
Liaoning	0.05	-0.095322		-0.142944
Shaanxi	0.04	-0.510394***		-0.515394***
Shandong	0.07	-0.107723		-0.164179
Shanxi	0.04	-0.379836***		-0.327757***
Sichuan	0.05	-0.332033***		-0.373938***
Xinjiang	0.04	0.066114		-0.078369
Yunnan	0.03	-0.579352***		-0.589985***
Zhejiang	0.06	-0.330327***		-0.338662***
<i>Attitudinal variables</i>				
Degree of harmony among lineages	2.87		0.058139***	0.052894***

Degree of harmony in village	2.83			0.044398***	0.043628***
Agree that money is important	2.33			-0.035800***	-0.016451
Importance of family	3.90			0.047914*	0.043801
Importance of friends	3.35			0.047098***	0.036951**
Importance of religion	1.13			0.015002	0.011971
Constant		0.572681***	1.211396***	0.901765***	1.452987***
Centred R-squared		0.211	0.257	0.338	0.357
Number of Observations		9072	9072	8308	8308

Notes:

1. Dependent variables: Score of happiness based on cardinal values assigned to qualitative assessments as follows: very happy=4; happy=3; so-so=2; not happy=1 and not at all happy=0.
2. Independent variables with cardinal values assigned to qualitative assessments so that greater intensity is represented by a higher value are: satisfaction with clinic, extent to which spokesman represents interests, level of harmony among villagers, level of harmony among friends, agreement that money is important; importance of family, importance of friends; importance of religion.
2. The omitted categories in the dummy variable analyses are: female sex; married; employed or labour force non-participant; plains; not healthy; in normal or worse than normal mood; current living standard the same as five years ago; Beijing.
- 3 ***, **, and * denote statistical significance at the one per cent, five per cent and ten per cent levels respectively.
4. Models (3) and (4) have been clustered at village level for robust standard errors.

Table 7
Determinants of Happiness for Households in the Lowest, Middle and Highest Income Per Capita Terciles for Households and for Provinces: OLS Regression Results, Selected Coefficients Only

<i>Household income terciles</i>	Lowest	Middle	Highest
Net financial assets ('000 Yuan)	0.006348**	0.002972*	0.000876
Working hours ('00 per year)	-0.001361*	-0.00077	-0.00056
Divorced	-0.891608***	0.082197	-0.49076
Widowed	-0.329292*	-0.02946	-0.13606
Extent to which spokesman represents interests	0.044376**	0.033230*	0.028793
Current living standards better than five years ago	0.202050***	0.209452***	0.193379***
Current living standards worse than five years ago	-0.260176***	-0.0537	-0.10455
Ln average per capita income at province level	0.316192***	0.119715*	0.021399
Constant	-1.19571	-0.81528	1.747056***
Centred R-squared	0.357	0.314	0.300
Number of Observations	2739	2766	2802

<i>Province income terciles</i>	Lowest	Middle	Highest
Log of per capita household income 2002 (Yuan)	0.120662***	0.014068	0.020585
Net financial assets ('000 Yuan)	0.003970**	0.001063	0.000891
Phone	0.095497**	0.043147	0.068197*
Satisfaction with clinic	0.065185***	0.055026**	0.041589*
Current living standards better than five years ago	0.230141***	0.182523***	0.192442***
Current living standards worse than five years ago	-0.326469***	-0.11414	-0.02752
Gini Coefficient at county level	1.093473**	0.267974	0.489644
Ln average per capita income at province level	0.521377**	0.084681	-0.225671**
Agree that money is important	-0.050125*	-0.01091	-0.01835
Constant	-3.310323**	0.672688	3.362212***
Centred R-squared	0.372	0.340	0.304
Number of Observations	2748	2742	2817

Notes:

1. Dependent variables: Score of happiness based on cardinal values assigned to qualitative assessments as follows: very happy=4; happy=3; so-so=2; not happy=1 and not at all happy=0.
2. Independent variables with cardinal values assigned to qualitative assessments so that greater intensity is represented by a higher value are: satisfaction with clinic, level of harmony among villagers, level of harmony among friends, agreement that money is important; importance of family, importance of friends; importance of religion.
2. The omitted categories in the dummy variable analyses are: female sex; married; employed or labour force non-participant; plains; not healthy; in normal or worse than normal mood; current living standard the same as five years ago.
- 3 ***, **, and * denote statistical significance at the one per cent, five per cent and ten per cent levels respectively.
4. Models have been clustered at village level for robust standard errors.

Table 8
Determinants of Happiness for Men and for Women: OLS Regression Results, Selected Coefficients Only

	Men	Women
Log of per capita household income 2002 (Yuan)	0.077574***	0.022056
Importance of money	-0.039985**	-0.02364
Phone	0.060560**	0.140260***
Household income much above village average	0.242382***	0.06989
Household income much below village average	-0.827432***	-0.743375***
Gini Coefficient at county level	0.953980**	0.58368
Expect big increase in income over next five years	0.164727***	0.301096***
Centred R-squared	0.331	0.365
Number of Observations	6213	2095

Notes:

1. Dependent variables: Score of happiness based on cardinal values assigned to qualitative assessments as follows: very happy=4; happy=3; so-so=2; not happy=1 and not at all happy=0.
2. Independent variables with cardinal values assigned to qualitative assessments so that greater intensity is represented by a higher value are: satisfaction with clinic, level of harmony among villagers, level of harmony among friends, agreement that money is important; importance of family, importance of friends; importance of religion.
2. The omitted categories in the dummy variable analyses are: female sex; married; employed or labour force non-participant; plains; not healthy; in normal or worse than normal mood; current living standard the same as five years ago.
3. ***, **, and * denote statistical significance at the one per cent, five per cent and ten per cent levels respectively.
4. Models have been clustered at village level for robust standard errors.

Table 9
Determinants of Happiness: The Effect of Reference Groups on the Comparison Terms
OLS Regression Results, Selected Coefficients Only

Comparison variable	Reference group	
	Within village	Outside village
Lived outside township for at least a year	-0.025776	-0.081376*
Household income much above village average	0.225474***	0.190949**
Household income much below village average	-0.829650***	-0.755990***
Current living standards better than 5 years ago	0.205127***	0.185469***
Current living standards worse than 5 years ago	-0.183342***	-0.04349
Gini Coefficient at county level	0.659716**	1.636956***
Expect big increase in income over next 5 years	0.258970***	0.002209
Expect small increase in income over next 5 years	0.143244***	-0.034832
Expect decrease in income over next 5 years	-0.051327	-0.235772***
R-squared	0.344	0.343
Number of observations	6304	2004

Notes:

1. Dependent variables: Score of happiness based on cardinal values assigned to qualitative assessments as follows: very happy=4; happy=3; so-so=2; not happy=1 and not at all happy=0.
2. 'Within village' is the sub-sample of individuals who compare themselves with friends, neighbours, or fellow villagers. 'Outside township' is confined to the sub-sample of those who compare themselves with people in the township, the county, the city, or the whole of China.
3. Independent variables with cardinal values assigned to qualitative assessments so that greater intensity is represented by a higher value are: satisfaction with clinic, level of harmony among villagers, level of harmony among friends, agreement that money is important; importance of family, importance of friends; importance of religion.
4. The omitted categories in the dummy variable analyses are: female sex; married; employed or labour force non-participant; plains; not healthy; in normal or worse than normal mood; current living standard the same as five years ago.
5. ***, **, and * denote statistical significance at the one per cent, five per cent and ten per cent levels respectively.
6. Models have been clustered at village level for robust standard errors.

Table 10
Robustness Check: Determinants of Happiness Categories, Probit, Ordered Probit and Instrumented Probit Estimation

	Probit		Ordered Probit		Instrumented Probit	
	Marginal Effects		Marginal Effects		Coefficients	
			Outcome: very unhappy or unhappy	Outcome: very happy or happy		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Basic variables</i>						
Age	-0.001977	-0.006895*	0.001596*	-0.006557*	-0.032072**	-0.0233
Age squared	0.00006	0.000111***	-0.000027***	0.000109***	0.000401***	0.000364**
Male (sex) (d)	-0.046336***	-0.031102**	0.004806	-0.020101	-0.02973	-0.118665*
Married (d)	0.028583	0.030638	-0.019996	0.072871*	0.066309	0.037934
Divorced (d)	-0.155294	-0.164061	0.095648	-0.249211**	-0.47255	-0.48818
Widowed (d)	-0.149314***	-0.114138*	0.034170*	-0.115093**	-0.473723***	-0.359171**
Ethnic minority dummy (d)	0.050714***	0.062174**	-0.013311**	0.059168**	0.342547***	0.133081
Education (years)	0.004565**	-0.001472	0.000397	-0.001632	-0.01827	-0.00282
Unemployed (d)	0.02141	0.008184	0.006316	-0.024833	-0.11088	0.092224
In good health (d)	0.247403***	0.191605***	-0.051164***	0.176434***	0.608048***	0.534643***
In a good mood (d)	0.317772***	0.235195***	-0.058179***	0.206625***	0.789053***	0.627646***
<i>Absolute income variables</i>						
Log of per capita household income 2002 (Yuan)	0.106518***	0.041423***	-0.010984***	0.045130***	1.227071***	0.12972
Net financial assets ('000 Yuan)	0.002058***	0.001068	-0.000329**	0.001352**	-0.007232*	0.002723
Working hours ('00 per year)	-0.000772***	-0.000622*	0.000142*	-0.000582**	-0.004848***	-0.00162
<i>Comparison variables</i>						
Lived outside township for at least a year (d)		-0.043906**	0.010045*	-0.039134**		-0.139394***
Household income much above village average (d)		0.107846**	-0.022815***	0.114599***		0.346318*
Household income above village average (d)		0.108041***	-0.021037***	0.095821***		0.295272***
Household income below village average (d)		-0.127266***	0.043047***	-0.148810***		-0.361035***

Household income much below village average (d)	-0.301675***	0.228973***	-0.426309***	-0.831732***
Current living standards better than 5 years ago (d)	0.116915***	-0.030531***	0.118211***	0.294890***
Current living standards worse than 5 years ago (d)	-0.061244*	0.030795***	-0.106277***	-0.142759*
Expect big increase in income over next 5 years (d)	0.124616***	-0.023826***	0.115485***	0.343448***
Expect small increase in income over next 5 years (d)	0.052045***	-0.013122***	0.052012***	0.178115***
Expect decrease in income over next five years (d)	-0.015743	0.01502	-0.056226*	-0.0392
Gini Coefficient at county level	0.349211*	-0.099959**	0.410684**	1.013816***
<i>Community variables</i>				
Phone (d)	0.063622***	-0.012599***	0.052405***	0.18366
Satisfaction with clinic	0.032236***	-0.006545***	0.026891***	0.078139***
Extent to which spokesman represents interests	0.028360***	-0.006103***	0.025073***	0.075360***
Total village population at end 2002 ('00s)	-0.002373***	0.000465***	-0.001909***	-0.006739***
Hilly terrain (d)	-0.047313**	0.010086*	-0.040246*	-0.109029**
Mountainous terrain (d)	-0.130152***	0.034752***	-0.124520***	-0.292827***
<i>Attitudinal variables</i>				
Degree of harmony among lineages	0.023416**	-0.006587***	0.027061***	0.060449**
Degree of harmony in village	0.031906***	-0.004224	0.017354	0.059075**
Agree that money is important	-0.030368***	0.007392***	-0.030369***	-0.100237***
Importance of family	0.043446*	-0.006184	0.025405	0.157623***
Importance of friends	0.021306**	-0.005200**	0.021365**	0.034624
Importance of religion	0.006525	-0.001557	0.006398	0.012033
Pseudo R-squared	0.1481	0.2233	0.1945	0.1945
Number of Observations	9072	8308	8308	8308

Instruments used	Father's years of education; productive assets	Father's years of education; productive assets
Significance of instruments in first stage equation	**	**
Father's years of education		

Productive assets	***	***
Amemiya-Lee-Newey minimum chi-sq statistic (P-val)	0.8486	0.0935
Wald test of exogeneity (P-val)	0.0013	0.9176

Notes:

1. Columns (1), (2), (5) and (6) report estimates relate to the probability of being very happy or happy. The omitted categories are so-so, not happy and not at all happy. For the dummy variables denoted by (d), the marginal effects are denote dy/dx for discrete change of dummy variable from 0 to 1
2. Independent variables with cardinal values assigned to qualitative assessments so that a higher value denotes greater intensity: agreement that money is important.
3. The omitted categories in the dummy variable analyses are: female sex; married; employed or labour force non-participant; not healthy; in normal or worse than normal mood; household at average village income; current living standard the same as five years ago.
4. ***, **, and * denote statistical significance at the one per cent, five per cent and ten per cent levels of the mariginals of the probit and ordered probit estimations, and of the coefficients of the instrumented probit estimation.
5. The Amemiya-Lee-Newey test results for overidentification of instruments were generated using Baum, Schaffer, Stillman and Wiggins' (2006) overid.ado programme for Stata. See Baum, C.F., Schaffer, M.E., Stillman, S., Wiggins, V. (2006).
6. Models (2), (3) and (4) have been clustered for robust standard errors at village level.

Table 11
Robustness Check: Determinants of Happiness with Income Instrumented: Second Stage
IV Estimates

	(1)	(2)
<i>Basic variables</i>		
Age	-0.020194***	-0.015327*
Age squared	0.000252***	0.000223***
Male (sex)	-0.03829	-0.080334**
Married	0.122714*	0.09093
Divorced	-0.434842**	-0.475525**
Widowed	-0.301194***	-0.217044*
Ethnic minority dummy	0.181426***	0.074735
Education (years)	-0.00441	-0.00048
Unemployed	-0.1453	-0.03682
In good health	0.385881***	0.282743***
In a good mood	0.527563***	0.363686***
<i>Absolute income variables</i>		
Log of per capita household income 2002 (Yuan)	0.578611***	-0.02365
Net financial assets ('000 Yuan)	-0.00226	0.002708
Working hours ('00 per year)	-0.002577***	-0.0005
<i>Comparison variables</i>		
Lived outside township for at least a year		-0.050894*
Household income much above village average		0.223652**
Household income above village average		0.116155***
Household income below village average		-0.285005***
Household income much below village average		-0.857860***
Current living standards better than 5 years ago		0.183311***
Current living standards worse than 5 years ago		-0.153166***
Expect big increase in income over next 5 years		0.194678***
Expect small increase in income over next 5 years		0.110459***
Expect decrease in income over next 5 years		-0.06602
Gini Coefficient at county level		0.923998***
<i>Community variables</i>		
Phone		0.109037
Satisfaction with clinic		0.054496***
Extent to which spokesman represents interests		0.044492***
Total village population at end 2002 ('00s)		-0.004307***
Hilly terrain		-0.061888*
Mountainous terrain		-0.195450***
<i>Attitudinal variables</i>		
Degree of harmony among lineages		0.057188***
Degree of harmony in village		0.026364
Agree that money is important		-0.053231***
Importance of family		0.064270**
Importance of friends		0.034357**

Importance of religion		0.013504
Constant	-1.985959**	1.56568
Centred R-squared	0.119	0.329
Number of Observations	7637	7033
<hr/>		
Instruments used	Father's years of education; productive assets	Father's years of education; productive assets
Significance of instruments in first stage equation		
Father's years of education	**	*
Productive assets	***	**
F-test of excluding instruments (P-val)	0.0000	0.0020
Anderson Rubin test of joint significance of endogenous regressors in main equation, F test (P-val)	0.0000	0.3199
Sargan test/ Hansen J statistic, for overidentification of all instruments (P-val)	0.6464	0.1307

Notes:

1. Dependent variable: Score of happiness based on cardinal values assigned to qualitative assessments as follows: very happy=4; happy=3; so-so=2; not happy=1 and not at all happy=0.
2. Independent variables with cardinal values assigned to qualitative assessments so that a higher value denotes greater intensity: satisfaction with clinic, extent to which spokesman represents interests, agreement that money is important, importance of family, friends, religion.
3. The omitted categories in the dummy variable analyses are: female sex; married; employed or labour force non-participant; not healthy; in normal or worse than normal mood; household at average village income; current living standard the same as five years ago; no change in income expected in next 5 years.
4. ***, **, and * denote statistical significance at the one per cent, five per cent and ten per cent levels respectively.
5. Instrumented variables regression results generated using Baum, Schaffer and Stillman's (2003), ivreg2.ado programme for Stata. See Baum, C. F., M. E. Schaffer, and S. Stillman. (2003).
6. Model (2) has been clustered at village level for robust standard errors.

Table 12

Relationships between Subjective Well-being Poverty and Income Poverty

Proportion of total sample in SWB poverty	9.02
The proportion of income poor who are also SWB poor:	
Income poor defined as the same proportion as the proportion that is SWB poor (i.e. 9.02%)	17.85
Income poor defined as the bottom 20% in terms of per capita household income	15.88
Income poor defined as the bottom 33.33% in terms of per capita household income	14.32

Note: Subjective well-being poverty is defined as reporting being unhappy or not at all happy.

Table 13

The Determinants of Subjective Well-being Poverty: Marginal Effects of Probit Estimates

	(1)	(2)	(3)	(4)	(5)
<i>Basic variables</i>					
Age	-0.000333	-0.000734	0.002479	0.000538	0.002076
Age squared	-0.00001	-0.000004	-0.000052	-0.000023	-0.000045
Male (sex) (d)	0.012198	0.011192	0.028331	0.027694	0.031845*
In a good mood (d)	-0.169238***	-0.168429***	-0.126555***	-0.101274***	-0.082838***
<i>Absolute income variables</i>					
Log of per capita household income 2002 (Yuan)		-0.015791			-0.000438
Net financial assets ('000 Yuan)		-0.002778**			-0.001787
Working hours ('00 per year)		0.000595			0.000413
<i>Capability variables</i>					
<i>a. Physical functionings</i>					
Education (years)			-0.000885		0.001505
In good health (d)			-0.152705***		-0.110085***
Satisfaction with clinic			-0.016545*		-0.013913*
Extent to which spokesman represents interests			-0.030296***		-0.014732**
Phone			-0.061875***		-0.029203
<i>b. Social functionings</i>					
Household income above village average (d)				-0.024121	-0.015317
Household income below village average (d)				0.174275***	0.147732***
Household income much below village average (d)				0.532579***	0.473981***
Unemployed (d)				0.048953	0.060642
Degree of harmony in village				-0.024162**	-0.014259
Importance of family				0.007784	0.008512
Importance of friends				-0.015191	-0.009962

Pseudo R-squared	0.059	0.064	0.119	0.181	0.211
Chi-squared	93.758	101.07	189.298	285.29	332.383
Number of Observations	1814	1814	1814	1806	1806

Notes:

1. The table reports marginal effects for the probability of being very unhappy or unhappy. The omitted categories are so-so, happy and very happy. For the dummy variables denoted by (d), the marginal effects are denote dy/dx for discrete change of dummy variable from 0 to 1
2. Independent variables with cardinal values assigned to qualitative assessments so that a higher value denotes greater intensity: satisfaction with clinic, extent to which spokesman represents interests, degree of harmony, importance of family, importance of friends,
3. The omitted categories in the dummy variable analyses are: female sex; in normal or worse than normal mood; not healthy; household at average village income; employed or labour force non-participant.
4. ***, **, and * denote statistical significance at the one per cent, five per cent and ten per cent levels of the marginals of the probit estimations.

