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TREADMILL IN A POOR SOCIETY**

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Income, Aspirations and the Hedonic Treadmill in a Poor Society

Abstract. A specially designed household survey for rural China is used to analyse the determinants of aspirations for income, proxied by reported minimum income need, and the determinants of subjective well-being, both satisfaction with life and satisfaction with income. It is found that aspiration income is a positive function of actual income and reference income, and that subjective well-being is raised by actual income but lowered by aspiration income. These findings suggests the existence of a partial hedonic treadmill, and can help to explain why subjective well-being in China appears not to have risen despite rapid economic growth.

Key words. Adaptation; Aspirations; China; Easterlin Paradox; Happiness; Hedonic Treadmill; Subjective Well-being

JEL classification. D60, O12, O15

1. Introduction

This paper explores the relationships among income, aspirations, adaptation and happiness in a poor society. How are people's aspirations determined? For instance, do they adapt their aspirations to their income, whether absolute or relative to that of their reference group or reference time? Is happiness affected by people's aspirations? For instance, do high aspirations reduce happiness? We use a specially designed data set for rural China which contains information not only on income but also on aspirations for income (call it 'aspiration income'), on several variables which can influence aspiration income, and on two measures of subjective well-being.

Section 2 provides a brief literature review of this rather unexplored subject, and Section 3 develops the theoretical hypotheses to be tested. The data and variables are explained in Section 4. Section 5 outlines the strategy for testing our hypotheses. Section 6 examines empirically the determinants of aspiration income, and Section 7 the aspirational determinants of two dimensions of subjective well-being: satisfaction with life and satisfaction with income. It is possible in Section 8 to suggest some novel and notable conclusions for the understanding of economic welfare.

1. Literature Review

There is a common view in the literature on subjective well-being that people adapt their aspirations in response to changes in their income. It was put forward by Easterlin (1974; see also 2001, 2005) as the explanation for the paradox that he observed: in cross-section studies at the individual level, happiness is found to rise with income, whereas in time-series studies at the national level, happiness does not rise as income increases.¹ This explanation of the 'hedonic treadmill' in terms of endogenous aspirations has been accepted by Frey and Stutzer (2001, 2002), and many others.

¹ He showed that in both the United States and Japan, income per capita had risen greatly over the post-war decades but cross-section measures of happiness had not risen at all over the same period (Easterlin, 1974).

From a very different perspective, Sen (e.g.1985, 1987, 1999) has argued that there can be reconciliation to poverty: the poor adapt their aspirations to their low income and poor quality of life. For instance:

A thoroughly deprived person, leading a very reduced life, might not appear to be badly off in terms of the mental metric of utility, if the hardship is accepted with non-grumbling resignation. In situations of longstanding deprivation, the victims do not go on weeping all the time, and very often make great efforts to take pleasure in small mercies and cut down personal desires to modest – ‘realistic’ – proportions. The person’s deprivation then, may not at all show up in the metrics of pleasure, desire fulfilment, etc., even though he or she may be quite unable to be adequately nourished, decently clothed, minimally educated and so on (Sen, 1990, p.45).

Sen and Easterlin have something in common. In both cases, the hypothesis is that people’s aspirations adapt to their situation, so reducing the sensitivity of subjective well-being to income. The notion that aspirations adjust to what is perceived to be possible is well established and much discussed from various perspectives, for instance by Elster (1982) from a philosophical, Frederick and Loewenstein (1999) from a psychological, Gurr (1970) from a political, and van de Stadt *et al.* (1985) from an economic perspective.

The inurement of the poor to their poverty leads Sen (e.g. 1985, 1987) to reject the metric of utility as the criterion for the evaluation of economic welfare, and to replace it with the concept of the ‘capabilities to function’, i.e. people’s capabilities to be and to do things of intrinsic worth. This separation only works, however, if the evaluation of capabilities involves an externally imposed value judgement rather than one which emerges from individual preferences. Kingdon and Knight (2006) have argued that, provided that the aggregation of expressed individual preferences is the criterion for evaluation, the estimation of subjective well-being functions offers an encompassing framework which yields weights for the valuation of income and various capabilities in a social welfare function; moreover, the estimation can provide a measure of ‘subjective well-being poverty’ and of its determinants.

There is a substantial literature on the causes of a quite different dimension of satisfaction or dissatisfaction: political discontent and its expression. For instance, Gurr (1970) argued that political discontent is felt, and expressed, only when people perceive that there is the prospect of change. Again, there is the notion that the downtrodden grow reconciled to their political lot: aspirations adapt to the prevailing conditions but they can rise, and even outpace the actual improvement, if conditions begin to improve.

Hirschman (1973) depicted the effect of changing expectations on perceptions of well-being using the analogy of a tunnel. Two lanes of cars are jammed in a tunnel. Eventually one lane begins to move forward. The satisfaction of those in the stationary lane initially rises, anticipating that they will soon follow, but subsequently this feeling turns to one of despair when nothing happens. Hirschman had in mind the effect of rising inequality in the process of economic development. Thus, it is possible that, as the income of people's reference group rises, so their expectations of income, and their happiness, initially rise in anticipation but, unless their income follows, subsequently fall.

There is a literature on the relationships that aspirations bear to past income and to expected future income. Psychological research has found that people tend to judge the past and the future by reference to 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). Clark (1999), using a British panel of employees, found that job satisfaction is strongly positively correlated with the change in pay between waves of the panel but is unrelated to the current level of pay.

The responses to a rise and a fall in income may differ. Analysing the aggregate consumption function, Duesenberry (1949) predicted asymmetry in the response of consumption to deviations of income from the highest level so far achieved, the reasoning being that people are willing and able to adapt their consumption aspirations upwards but not downwards. Burchardt (2005) used a ten-year panel of the British Household Panel Survey to analyse the relationship between satisfaction with income and both the level of income and its change. She found that the effect of current income was significantly

positive and the effect of a fall in income from its previous level was significantly negative. By contrast, the effect of a rise in income was not significantly different from that of static income (the omitted category), at least in the long term. These results imply asymmetry: people adapt their aspirations to rising income but less so to falling income.

There is much economic literature providing evidence for many countries that relative income affects happiness, and generally inferring that endogenous aspirations are the explanation for this effect (well surveyed by Clark *et al.*, 2008). Moreover, the same results have been obtained, and the same inference drawn, for rural China (Knight *et al.*, 2009). In some cases, however, more evident proxies for aspirations have been used. For instance, in the case of the US Easterlin (2005) found that there was a positive and commensurate relationship between the number of consumer durables desired and possessed by a cohort over time, and that the proportion of a cohort reporting to have 'a lot of money' stayed fairly constant over the life cycle despite rising income.

There has been little attempt so far to tackle our question directly by measuring aspiration income and estimating its determinants, and then including both aspiration income and actual income as determinants of subjective well-being. However, pioneering research by Stutzer (2004) answered the same question that is posed in this paper, and with a similar methodology, but did so for a rich society, Switzerland. It was found that aspiration income reduces subjective well-being, and that aspiration income is a positive function of lagged income. Thus, in response to an increase in income, the negative effect of the consequent increase in aspiration income tends to offset the direct positive effect on subjective well-being of the increase in actual income. Nevertheless, the cross-section relationship between current income and subjective well-being, although muted by endogenous aspiration income, is positive. Aspiration income is found to be a positive function of current income, previous income, and community income.

2. Hypotheses

This section is influenced by Stutzer (2004). We hypothesize that happiness is a positive function of income and a negative function of aspiration income. A simplified linear happiness function might thus be expressed as:

$$H = aY - bA \quad (1)$$

where H is a score of happiness, Y is income, A is aspiration income, and a and b are parameters ($a, b > 0$). In principle, it is possible that $b = a$. If aspiration income is a positive and linear function of income, we have an adaptation function:

$$A = cY \quad (2)$$

The parameter c indicates the extent to which aspirations rise with income. Combining equations (1) and (2), we have:

$$H = (a - bc)Y \quad (3)$$

The term $(a - bc)$ represents the extent to which happiness changes with income. Thus, $\delta H/\delta Y > 0$ provided that $a > bc$. The ‘hedonic treadmill’ is represented by $a = bc$, i.e. the positive effect of a rise in income on happiness is precisely offset by the negative effect of the consequent rise in aspiration income.

Current income is not the only potential determinant of aspiration income. For instance, past income may also have an influence. We hypothesise that a recent rise in income raises happiness but a recent fall in income lowers it. This is plausible if people have not yet fully adapted to their recent change in income. With Y given, we expect Y_p , representing past income, to have a positive sign – the higher is Y_p the higher is aspiration income, A . Another potential influence is the reference group with which people compare themselves. Our hypothesis is that the higher the income of the reference group, Y_r , the higher is A .

Our full specification for the equation predicting aspiration income is therefore:

$$A = A(Y, Y_p, Y_r, \dots) \quad (4)$$

where $\delta A/\delta Y > 0$, $\delta A/\delta Y_p > 0$, $\delta A/\delta Y_r > 0$. Our specification of the happiness function is:

$$H = H(Y, A, \dots) \quad (5)$$

where $\delta H/\delta Y > 0$, $\delta H/\delta A < 0$. However, our measure of A might be imperfect or aspirations might have an effect on happiness independently of their effect on aspiration

income, A . If so, it would be appropriate to include such variables as Y_p and Y_r in equation (5) as well as in equation (4).

These equations look too simple: there are several potential econometric problems to be solved. With regard to equation (4), it is possible that Y is a function of A , or that both Y and A are influenced by unobserved variables. Similarly both Y and A might be endogenous in equation (5).

3. Data, Variables and Background

The data come from the national household survey for China, conducted in 2003 and relating mainly to 2002, of the Institute of Economics, Chinese Academy of Social Sciences (IE, CASS). The survey was conducted by the National Bureau of Statistics (NBS) and was based on a representative sub-sample of the annual official household survey. It was designed by a research team of Chinese and foreign scholars, including one of the authors, with research hypotheses in mind, and thus the questionnaires contained many more questions than did the official survey. There were separate sub-samples and questionnaires for rural and for urban residents, and for rural-urban migrants. In this paper we concentrate on the rural survey, for which we designed a special module of the questionnaire in order to investigate subjective well-being. We are thus able to combine the information on subjective well-being with a wealth of socioeconomic data on rural communities, households and their individual members.

The rural survey covers 22 of China's 31 provinces and is intended to be nationally representative. Within each province on average 5.5 counties were sampled, and within each county on average 7.9 villages; in both cases selection was on the basis of income per capita ranking with a random starting point. Within each village normally 10 households were randomly sampled. The rural sample thus contains roughly 9,500 households.

In each household one member – normally the household head – was asked a set of attitudinal questions, including some about subjective well-being. A novelty of this data

set is that it contains information on different dimensions of subjective well-being. In this paper we analyse two dimensions that were distinguished. The broader one is ‘happiness’ or ‘satisfaction with life’ (we use the terms interchangeably) and the narrower is ‘satisfaction with income’. In each case the respondents were offered five choices: very satisfied, satisfied, so-so, dissatisfied, and not at all satisfied. When treated as a dependent variable, these answers can be converted into a cardinal value (with very satisfied given a score of 4, down to not at all satisfied, given a score of 0), or into a binary variable (distinguishing very satisfied or satisfied from the three categories below them), or into a ranking of three categories (very satisfied or satisfied, so-so, and dissatisfied or very dissatisfied). These three dependent variables can then be analysed by means of OLS, probit, or ordered probit estimation models respectively. In fact our estimations produced no notable differences in the three sets of results, and we therefore report only the estimates for the happiness score.²

Several other attitudinal or subjective questions were asked, including the minimum income needed by the household. This we shall take as a potential proxy for aspiration income, to be explained by a set of demographic, economic, social and aspirational variables. Respondents were asked about the change in their income over the previous five years, their expectations for their income over the following five years, the people with whom they compared themselves, and about their perceived position in the village income distribution. We shall introduce these variables as they enter the analysis.

Table 1 reports the percentage distribution of respondents among the five categories of satisfaction, for both subjective well-being variables. We see from column 1 that many people are satisfied (rows 1 and 2), and few are dissatisfied (rows 4 and 5), in the case of the more general measure (satisfaction with life), but that the division is even in the case of the more specific measure (satisfaction with income). This distinction is confirmed in the mean scores: 2.7 for life and 2.0 for income satisfaction. When the distributions are shown by income per capita quintile, in each case there is a monotonic rise in satisfaction as we move up the income quintiles: income does indeed contribute to subjective well-

² This was also found to be the case in a methodological paper by Ferrer-i-Carbonnel and Frijters (2004).

being. Moreover, the difference in mean score between the highest and the lowest quintile is greater for satisfaction with income (0.7) than for happiness (0.5). This confirms our expectation that income is more important for yielding satisfaction with income than it is for yielding satisfaction with life.

It is possible that well-being depends more on the fulfilment of basic needs and less on the fulfilment of aspirations in the case of the poor than of the non-poor. We also explored the relationship between income and subjective well-being in another way, by examining alternative concepts of poverty (Table 2). Kingdon and Knight (2006) introduced the concept of 'subjective well-being poverty': they defined the subjective well-being poor as those who were either not happy or not at all happy. Here we use our two measures of subjective well-being. The first row of the table indicates that the proportion of households in 'satisfaction with life poverty' was 9%, but 37% were in 'satisfaction with income poverty'. The second row shows that, of the 'income poor' – the third of households with the lowest income per capita – 14% were in 'satisfaction with life poverty' and 48% in 'satisfaction with income poverty'. In the third row the 'income poor' are defined as constituting the same proportion of households as the 'subjective well-being poor', e.g. in column 1, since 9% of households are 'happiness poor', it is assumed that the 'income poor' are the lowest 9% of households in terms of income per capita. We see in row 3 that 19% of the 'income poor' are also 'satisfaction with life poor' and that 48% of the 'income poor' are also 'satisfaction with income poor'.

In summary of Table 2, it appears that, at the lower tails of the various distributions, there is some, but very incomplete, overlap. Income and subjective well-being are positively related, especially in the case of the narrower concept, satisfaction with income. In its extreme form – of aspirations adapting fully to own income - the Hedonic Treadmill is not being trodden. However, other factors clearly enter into the determination of subjective well-being. Our concern in this paper is to investigate the importance of aspirations, and their determinants, in explaining subjective well-being.

4. Testing Strategy

We follow Stutzer (2004) in our strategy for testing the hypotheses. His measures of aspiration income were the income that respondents reported as being either 'sufficient' or as the 'minimum required'; the two measures produced very similar results. His aspiration income equation included household income in the previous year, a report of financial situation in the past, and conditioning variables. Aspiration income was a positive function of household income (the coefficient being about 0.4, with the income variables in logarithmic form) and of past financial situation. Another equation included relative income (average income in the community, there being about 500 communities). There was a significantly positive coefficient on the community variable. Because this might arise if the cost of living is positively correlated with the prosperity of the community, a proxy for the strength of social comparison - a report of contact with neighbours - was interacted with community income. The interaction term also had a positive coefficient: more social interaction strengthens the positive effect of community income on aspiration income. Turning to the happiness function: when (the logarithm of) aspiration income was excluded, the household income variable had a significantly positive effect (about 0.25) in the equation. When aspiration income was also included, the income coefficient was raised (to about 0.40) and the aspiration coefficient was significantly negative (about -0.35). The results were found to be robust when aspiration income was instrumented to guard against the possibility of unobserved personal traits (such as neuroses) lowering happiness but raising aspirations.

We shall similarly estimate aspiration income functions that include current income, previous income, and relative income among the arguments. These aspiration income estimates will lead on to subjective well-being functions that include both aspiration income and actual income as explanatory variables. It will be necessary to test for the endogeneity of both aspiration income and actual income and to correct for this by means of instrumenting.

6. The Determinants of Aspiration Income

Aspiration income (the variable A in equations 1-5) is easier to conceptualise than to quantify. Our potential proxy for A is the respondent's answer to the question: what is the minimum income needed to sustain the household for a year? If this is found to be based only on demographic and physiological factors, then it should be viewed simply as a measure of need. However, if it found to depend also on characteristics such as income - absolute or relative to the reference group or the reference time - then it might well be viewed as aspiration income. That is indeed what we find.

Table 3 reports our estimates of the determinants of minimum income need. The dependent variable takes two forms: income need in levels and in logs. In each case we use a full set of explanatory variables, including potential determinants of basic income need as well as current income and several other potential determinants of aspiration income. Because spatial differences in the cost of living could result in a positive association between actual income and aspiration income, we attempt to correct for this by deflating both income measures using the spatial price differences for China that were calculated by Brandt and Holtz (2006). We tried two alternative ways of dealing with household size effects. One includes \ln . household size and the other the number of household members in each age-sex group. As there are no notable differences in the estimated coefficients of all the other variables, we present only one set of results, choosing the latter specification as it proves to be more informative.

We start with the variables that might reflect basic income need. The coefficients of both age and age squared are significantly different from zero. In the levels equation, the income needed by the household rises with the age of the respondent but at a diminishing rate, and peaks at the age of 41 (column 2). Men perceive that the household needs significantly less income than do women, at least in the full specifications (columns 2 and 4). By comparison with single status (and standardising for household composition as well as income), married respondents perceive higher income need. As is to be expected, being in good health has a significant negative coefficient. Hilly and, especially, mountainous terrains significantly raise the income needed by the household, suggesting that physical needs or unobserved aspects of the cost of living are greater in those

environments. The degree of satisfaction with the village clinic significantly reduces income need, possibly by reducing perceived insecurity.

The household composition variables all have significantly positive coefficients, as expected. Representing the additional income needed on account of there being one more person in each age-sex group, they are highest for men over 65 and lowest for boys under 10. In the levels equation (column 2) this set of coefficients can be viewed as providing a set of weights for the income needs of different types of household member. They effectively yield subjectively determined 'adult equivalent' scales. Thus, if the need of an adult male is 100, then that of an adult female is 149, those of senior citizen males and females 174 and 102 respectively, those of male and female teenagers 47 and 61, and those of male and female children 10 and 45. This pattern, mirrored in the logarithmic equation, suggests surprisingly that, except in the case of old people, females are perceived to have greater income needs than males.

We turn to the variables which might influence aspirations for income, concentrating on those that have significant coefficients. The income per capita variable has a coefficient that is both positive and significant. In levels form, the coefficient is 0.12 in both specifications, i.e. a rise in household income per capita increases the income that the household is perceived to need by an eighth of that amount. In logarithmic form, the elasticity of needed income with respect to actual income has a value of 0.21 in the restricted specification and 0.19 in the full specification.. These results suggest that aspirations for income adapt in part to current income. There is a wealth effect as well as an income effect, but it has the opposite sign. The coefficient on net financial assets is significantly negative in the levels equation (column 2): liquid wealth appears to provide security rather than to raise aspirations.

Income need is significantly increased if the respondent had experienced a fall in living standards over the previous five years. This suggests that aspiration income is influenced by previous income and that aspirations do not fully adapt to a fall in income. The cardinal variable denoting the degree of importance attached to money has a significantly

positive coefficient in the logarithmic equation. This might result either from having an objective need for higher income or from having a materialistic personality. Some variables that are not necessarily economic also appear to affect aspiration income. The more years of education the respondent has received, the higher the income needed: the coefficient is positive, and significantly so.. Household possession of a phone raises the income needed substantially and significantly, a result which might reflect having broader and richer reference groups.

Column 4 adds variables to the logarithmic equation that are intended to show the effect of comparator income. Having the main reference group beyond the village raises the income needed substantially and significantly. When this variable is interacted with the log of household per capita income the coefficient is negative (equation not reported), suggesting that the effect of making comparisons beyond the village on aspirations falls as the income disparity declines. However, over two-thirds of the sample report that their main reference group is within the village. Respondents were asked whether their income was much above, above, at, below, or much below the average income of the village. When the perceived income rank within the village is included, we see that having income below the village average, especially if it is much below, raises needed income..

Table 4 shows the result of instrumenting household income. It is difficult to find variables in the data set which determine income but do not plausibly affect aspiration income as well. We eventually chose combinations of father's years of education, productive (as opposed to financial) assets, and being male. The instrumenting passes the standard statistical tests, as reported at the end of the table. There is little notable change in any of the determinants other than the instrumented variable. The coefficient remains significantly positive in both equations, but it is nearly doubled in the equations in levels and nearly tripled in the equations in logs. The latter results imply that the elasticity of income need to current income exceeds one half. Since unobserved variables which might plausibly raise income (e.g. ambition or ability) would be likely also to raise rather than lower aspirations, so producing upward bias, the increase in coefficients came as a surprise; it might reflect correction for downward attenuation bias.

Our estimate of the effect of income on aspiration income might still be too low because the cross-section nature of the data set cannot account for lags in the adjustment of aspiration income. *Ceteris paribus*, insofar as those with current income above their normal income report lower minimum income needs, and *vice versa*, the coefficient on income in the aspiration income equation is likely to be biased downwards.³

In summary, the level of income which people regard as the minimum necessary for their household is not just a matter of objective need but also a reflection of their aspirations. Current income raises aspiration income - a result which is merely reinforced by our attempt to correct for the possible endogeneity of current income. Aspiration income is also raised by the income of the relevant reference group or reference time.

7. The Aspirational Determinants of Happiness

Do aspirations affect happiness and, if so, how and to what extent? Table 5 reports the OLS subjective well-being functions – one predicting satisfaction with life and the other satisfaction with income. Columns 1 and 2 present the basic variables, columns 3 and 4 add only our central aspiration variable, ln. minimum income needed, and columns 5 and 6 include a full set of aspiration variables.

Insofar as the specifications overlap, the coefficients on the basic variables are similar to those obtained in our previous study of subjective well-being in rural China (Knight *et al.*, 2009). For instance, we find the familiar U-shaped relationship with age, being male and working longer hours reduces satisfaction, and marriage, education, net financial assets, being in good health and in a good mood all raise it. Predictably, the coefficient on ln household income per capita is larger in the case of satisfaction with income than in the case of satisfaction with life.

³ This argument is analogous to that of Friedman (1957) in explaining the cross-section consumption function.

Our interest lies in the introduction of the aspiration variables. The first two rows of the table are the most important. The introduction of ln. per capita minimum income needed raises the coefficient on ln per capita income in the happiness equation, from 0.21 in column 1 to 0.23 in column 3, but ln. per capita minimum income needed itself has a negative coefficient (-0.08). The same pattern is found for satisfaction with income (the corresponding coefficients being 0.31, 0.35 and -0.10 respectively). When other variables that might influence aspirations are entered as well, the effect is to reduce the size of the coefficients a little but to retain the pattern. Thus, the coefficients on the income and income need variables become 0.15 and -0.06 respectively in the satisfaction with life equation (column 5, and 0.23 and -0.08 in the satisfaction with income equation (column 6. All of these coefficients are highly significant.

The other variables that might influence aspirations generally also have significant coefficients. The sole exception is the dummy variable indicating that the respondent had lived outside the township for at least a year. This was introduced because it could represent possession of more information about life beyond the village and the broadening of the reference group to include generally richer people. In both equations the coefficient is negative, as expected, but it is significantly so only in the prediction of satisfaction with income. The variable indicating the strength of agreement with the statement that money is important shows an interesting contrast. It has a negative coefficient in column 5, suggesting that having a materialistic personality reduces happiness overall, but a positive coefficient in column 6, suggesting that people keener to get income make greater effort to ensure a satisfactory level of income.

Both dependent variables are highly sensitive to perceived position in the village income distribution. Aspirations are framed by the reference group, and feelings of relative deprivation give rise to unfulfilled aspirations and thus to dissatisfaction. Not only the reference group but also the reference time can have a bearing. Respondents were asked whether their current living standard was better or worse than, or the same as, five years previously. The positive coefficient on a rise and the negative coefficient on a fall over that period suggest that aspirations are partly set in the past. Tables 3 and 4 provided

evidence of 'loss aversion', i.e. aspiration income was higher if the respondent had suffered a fall in income over the past five years. Even standardising for aspiration income, we see that memories of time past influence subjective well-being present.

.In summary, there is evidence that a broader reference group, change in income over the past five years, the degree of emphasis placed on the importance of money, and perceived rank in the village income distribution all affect happiness. These variables suggest that aspirations are a function not only of own income but also of own income in relation to the reference group and the reference time.

Respondents were also asked how they expected their income to change over the next five years. In both equations we see a monotonic and powerful rise in coefficient values as the expected increase in income rises. This suggests that people internalise their expected future income into their current subjective well-being, but also that they cannot predict the rise in aspirations which is likely to accompany that rise in income. This squares with the psychological evidence, referred to above, that people are less good at predicting their aspirations than their objective conditions.

The estimates of Table 5 are open to the criticism that the key variables might be endogenous. Accordingly we re-estimated the equations with both ln. per capita income and ln. per capita income need instrumented. This involved a systematic search for instruments that were not weak, were valid, and were unlikely directly to influence subjective well-being. The test results are reported at the end of Table 6: in each case the excluded instruments are strong, they pass the Sargan test of validity wherever it can be applied, and they are generally needed. Various combinations of instruments were eventually used, drawn from father's years of education, spouse's years of education, productive assets, and the household composition variables.

The precision of the estimated coefficients in Table 6 is generally lower than in Table 5, but the pattern of results is not notably affected, e.g. there are no statistically significant changes of sign. Accordingly, we concentrate on the coefficients of the instrumented

variables, reported in the first two rows. Columns 1 and 2 show the effect of instrumenting income: the coefficient is roughly doubled, to 0.55 and 0.59 for satisfaction with life and with income respectively. The rise might reflect some unobserved variable, for instance high aspirations, raising income but lowering satisfaction, or else correction of attenuation bias. When aspiration income is introduced and instrumented as well as income, the pattern of Table 5 is again observed (columns 3-6). The coefficient of the income variable is positive and that of the aspiration income variable is not only negative but in each case has a lower absolute value. However, despite much searching, it was not possible to find instruments which could generate statistically significant coefficients for these variables. The causal effect of aspiration income on subjective well-being deserves further research..

8. Concluding Comments

Economists have long recognised that economic aspirations and well-being are contextual (Smith, 1776: 466; Marx, 1849: 163). Knight (1922) argued that wants and aspirations are malleable - they change easily and unpredictably and are endogenous to income and consumption - and for this reason can undermine the notion of utility as a criterion for normative analysis. Robinson (1956: 15) noted that 'there are two ways of satisfying desires: one is to get more and the other is to want less'. Kahneman et al. (1998) distinguished 'expected utility' and 'experienced utility'. These are concepts that Kimball and Willis (2006) appeared to refer to as 'utility' and 'happiness' respectively. Economists focus on the former, which is relevant to economic decision-making, and tend to ignore the latter. This focus might be justified if there were not systematic differences between the two. Systematic differences would not arise if aspirations were tethered, or were accurately predicted. However, the evidence suggests that aspirations tend to follow own income, or reference income, possibly with a lag, and that people cannot predict their aspirations well.

The interplay between income and aspirations for income can give rise to a Hedonic Treadmill and provides a possible explanation for the Easterlin Paradox. This is what motivates the paper: our objective was to measure the determinants of aspirations for

income, in particular the influence of actual income, and to measure the determinants of subjective well-being, in particular the influence of aspirations for income. The hypothesis was that aspirations are endogenous and need to be understood, as a guide to both positive and normative economic analysis.

The results (Tables 3 and 4) suggest that our measure of aspiration income increases in response to an increase in actual income. Moreover, insofar as this cross-section data set does not allow us to examine lags in the adjustment of aspirations to changes in income, our measured coefficient may well understate the full effect of income on aspiration income. Aspiration income also increases in response to an increase in the income of reference people and reference times. This evidence of relative deprivation suggests that people frame their aspirations according to the comparisons that they make, and that they aspire to higher income if these aspirations are not fulfilled.

Aspiration income in turn reduces satisfaction with life and satisfaction with income, although the positive coefficient on actual income is larger (Tables 5 and 6). There is indeed a Hedonic Treadmill but it is only a partial one. Subjective well-being is also directly sensitive to certain variables which represent relative deprivation in relation to other people or other times, so generating aspirations to match other people or other times. These results are not weakened by our attempts to establish causal relationships by means of instrumenting actual income and aspiration income, although the instrumenting is not conclusive.

We attempted to measure, and indeed found, a causal effect of own income on aspiration income: a proportionate rise of own income produces a proportionate rise in aspiration income that is more than half as large (Table 4). Nevertheless, it is possible that the association between actual income and aspiration income also contains some reverse causation, i.e. people with higher aspirations apply more effort in order to raise their incomes. This effect might be viewed as making an important contribution to economic development. However, it might instead be viewed as keeping people on the straight and

narrow and circular (to use the topology of a treadmill). Given that the Hedonic Treadmill is only a partial one, both views are simultaneously tenable.

Easterlin and Sawangfa (2009: 56-7) provide evidence of recent trends in measured life satisfaction in China, drawn from three available sources: the World Values Survey, the Gallup Survey, and the Asiabarometer Survey. The sources had different units of measurement but in each case the average score fell: from 6.83 to 6.76 between 1995 and 2007, from 2.82 to 2.67 between 1995 and 2007, and from 3.73 to 3.68 between 2000 and 2007, respectively. Our evidence of a partial Hedonic Treadmill, based on own income, in rural China contributes to the explanation of this declining happiness in China as a whole but cannot fully explain it. Another contribution comes from the evidence, in our data set as in many others, that subjective well-being is much influenced by relative income. Even rapid income growth need have little effect on perceived satisfaction if relative income remains constant. Moreover, the socioeconomic changes occurring in the process of China's rapid economic growth, reform and marketization are likely to have played a part, including rapid urbanization, changing reference groups, increasing urban economic insecurity, and rising inequality (Knight et al., 2009, Knight and Gunatilaka, 2010a, 2010b).

The existence and extent of adaptive aspirations is an important issue for both the utility-based approach and the capabilities-based approach to social evaluation. The results of this paper – more striking because they relate to a poor society - add another tiny step towards what might eventually be a paradigm shift in economists' conventional notions of economic welfare, which in turn could have a myriad of policy implications.

Table 1

Percentage Distribution of Subjective Well-being, Overall and by Income Quintile, Rural China

	Overall	Income Quintile					
		1 st	2 nd	3 rd	4 th	5 th	5 th -1 st
<i>Happiness</i>							
very happy	15.8	10.3	13.3	14.1	19.3	21.7	11.4
happy	46.5	36.8	42.6	49.2	50.4	53.4	16.6
so-so	28.9	36.2	33.7	28.6	25.1	20.8	-15.4
not happy	7.9	14.3	9.0	7.5	4.9	3.9	-10.5
not happy at all	0.9	2.3	1.3	0.6	0.3	0.2	-2.2
total (number)	8996	1799	1799	1799	1799	1800	
mean happiness	2.7	2.4	2.6	2.7	2.8	2.9	0.5
<i>Satisfaction with income</i>							
very satisfied	10.1	6.1	7.0	9.5	12.0	15.9	9.8
satisfied	29.2	19.6	25.5	27.9	34.4	38.4	18.8
so-so	24.0	22.9	23.8	25.3	25.1	22.9	0.0
not satisfied	23.7	30.1	30.2	24.1	19.4	14.6	-15.5
not satisfied at all	13.1	21.3	13.6	13.2	9.2	8.2	-13.1
total (number)	8996	1799	1799	1799	1799	1800	
mean satisfaction	2.0	1.6	1.8	2.0	2.2	2.4	0.7

Notes:

Level of happiness is based on cardinal values that are assigned to qualitative assessments as follows: very happy=4; happy=3; so-so=2; not happy=1 and not at all happy=0.

Level of satisfaction with income is based on cardinal values assigned to qualitative assessments as follows: very satisfied=4; satisfied=3; so-so=2; not satisfied=1 and not at all satisfied=0.

Data for this table and for all subsequent tables are derived from the Rural Household Survey, 2002.

Incomes in this table, and all subsequent tables, are corrected for spatial differences in the cost of living by means of the spatial price indices calculated by Brandt and Holtz (2006).

Table 2

Relation of Subjective Well-being Concepts to Income Poverty

	“Satisfaction with life” poverty (% unhappy or very unhappy)	“Satisfaction with income” poverty (% dissatisfied or very dissatisfied)
Proportion of total sample in SWB poverty	8.87	36.74
Proportion of bottom third (in terms of per capita income) of sample in SWB poverty	14.38	48.47
Of the income poor (defined as the same proportion as the proportion that is SWB poor), the proportion that is SWB poor	18.67	47.87
Proportion of sample in SWB poverty that is also in income poverty (as defined in the third row)	1.66	17.59

Table 3
Determinants of Income Need: OLS Estimation

	Mean or proportion	Absolute	Absolute	Logarithm	Logarithm
		(1)	(2)	(3)	(4)
Total household income (Yuan)	9660.13	0.12***	0.12***		
Log of total household income	8.97			0.214544***	0.189531***
<i>Other aspiration variables</i>					
Net financial assets ('000 Yuan)	5.52		-32.82***		-0.001471
Current living standards better than 5 years ago	0.60		-262.45		-0.002653
Current living standards worse than 5 years ago	0.05		1063.82**		0.200728***
Agree that money is important	2.35		199.55		0.045761***
Education (years)	7.14		163.41***		0.025571***
Phone	0.40		446.44*		0.112470***
Main reference group beyond village	0.11		782.92*		0.100161**
Household income much above village average	0.02		205.65		0.070678
Household income above village average	0.18		425.57*		0.052439*
Household income below village average	0.20		257.73		0.053649*
Household income much below village average	0.03		1670.42**		0.188881**
<i>Conditioning variables</i>					
Age	45.26	227.89***	214.20***	0.025795***	0.023823***
Age squared	2159.52	-2.56***	-2.29***	-0.000322***	-0.000281***
Male	0.75	-96.8	-339.71*	-0.018605	-0.052313**
Married	0.95	754.14*	852.26**	0.179376*	0.176272**
Divorced	0.00	505.57	603.07	0.218173	0.225053
Widowed	0.02	91.06	507.80	0.061044	0.13155
In good health	0.74	-586.14***	-494.15**	-0.090266***	-0.080823***
Hilly terrain	0.29	594.85*	522.07*	0.077904*	0.079657*
Mountainous terrain	0.27	1253.67***	1237.66***	0.081146	0.090112*
Satisfaction with clinic	2.34	-314.68***	-292.44***	-0.050978***	-0.049787***

Ethnic minority dummy	0.14	-406.98	-356.96	-0.016099	-0.005044
Senior citizens, male, aged 65+	0.10	1196.05***	1210.02***	0.170443***	0.174814***
Senior citizens, female, aged 65+	0.11	758.08***	714.59***	0.121872***	0.116292***
Adult males of 18 to 64 years	1.48	663.31***	697.01***	0.118703***	0.128360***
Adult females of 18 to 64 years	1.39	870.06***	888.27***	0.140793***	0.142299***
Teenaged males of 11 to 17 years	0.36	348.65**	325.85**	0.104031***	0.107355***
Teenaged females of 11 to 17 years	0.31	446.61***	422.10***	0.104963***	0.105044***
Children, males less than 11 years	0.27	30.85	69.00	0.014173	0.024714
Children, females less than 11 years	0.22	284.95	314.44*	0.023904	0.034355
Constant		-2557.40**	-4437.78***	5.562697***	5.410067***
R-squared		0.063	0.081	0.118	0.14
Number of observations		6625	6428	6425	6231

Notes:

1. Dependent variables: minimum income needed (Yuan) (mean 6019, standard deviation 6048); logarithm of minimum income needed (mean 8.455, standard deviation 0.731).
2. Independent variables with cardinal values assigned to qualitative assessments so that greater intensity is represented by a higher value are: satisfaction with clinic, agreement that money is important.
3. The omitted categories in the dummy variable analyses are: female sex; married; plains; not healthy; in normal or worse than normal mood; current living standard the same as five years ago; main reference group within village; household at average village income.
4. ***, **, and * denote statistical significance at the one per cent, five per cent and ten per cent levels respectively.
5. The models have been clustered at village level for robust standard errors.

Table 4
Robustness Check: Determinants of Income Need with Income Instrumented

	Absolute	Absolute	Logarithm	Logarithm
	(1)	(2)	(3)	(4)
Total household income ('000 Yuan)	0.23***	0.21***		
Log of total household income ('000 Yuan)			0.512848***	0.600643***
<i>Other aspiration variables</i>				
Net financial assets ('000 Yuan)		-48.27***		-0.006030***
Current living standards better than 5 years ago		-193.32		-0.026736
Current living standards worse than 5 years ago		1242.48***		0.208574***
Agree that money is important		270.34*		0.064294***
Education (years)		164.84***		0.022648***
Phone		191.79		-0.002927
Main reference group beyond village		455.38		0.084906*
Household income much above village average		180.97		0.000985
Household income above village average		367.45		0.000316
Household income below village average		462.39*		0.130409***
Household income much below village average		2254.23**		0.376627***
<i>Conditioning variables</i>				
Age	202.71***	200.25***	0.013777	0.008685
Age squared	-2.29***	-2.14***	-0.000179*	-0.000109
Male	62.66	-223.35		
Married	801.93*	987.50**	0.158553	0.182209*
Divorced	566.61	660.37	0.219129	0.261461
Widowed	197.14	508.19	0.029495	0.066921
In good health	-765.75***	-561.31**	-0.118962***	-0.086753***
Hilly terrain	620.59*	440.59	0.065822	0.0435
Mountainous terrain	1526.76***	1240.17**	0.140536**	0.116621*
Satisfaction with clinic	-371.85***	-345.34***	-0.061785***	-0.058515***

Ethnic minority dummy	-102.21	-120.38	0.029426	0.037571
Senior citizens, male, aged 65+	1367.00***	1355.87***	0.170204***	0.163564***
Senior citizens, female, aged 65+	744.48**	777.91***	0.101451***	0.096128**
Adult males of 18 to 64 years	602.83***	666.44***	0.085455***	0.078543***
Adult females of 18 to 64 years	755.96***	808.26***	0.101795***	0.098513***
Teenaged males of 11 to 17 years	323.94**	260.79	0.083981***	0.063897***
Teenaged females of 11 to 17 years	418.94***	381.34***	0.092243***	0.077426***
Children, males less than 11 years	75.83	77.84	0.014225	0.003937
Children, females less than 11 years	280.74	287.97	0.023385	0.022242
Constant	-2777.01**	-4835.66***	3.285372***	2.244474*
Number of observations	5651	5546	5458	5356
Significance of exclusion restrictions in first stage equation				
Father's years of education	***	ns	***	*
Productive assets	**	***	**	***
Male			***	**
F-test of excluding instruments (P-val)	0.0001	0.0005	0.0000	0.0000
Hansen J test for overidentification of all instruments (P-val)	0.9860	0.9447	0.7175	0.8575
Anderson Rubin test of joint significance of endogenous regressors in main equation, F test (P-val)	0.0468	0.1344	0.0199	0.0144

Notes:

1. Dependent variables: minimum income needed (Yuan), logarithm of minimum income needed.
2. Independent variables with cardinal values assigned to qualitative assessments so that greater intensity is represented by a higher value are: satisfaction with clinic, agreement that money is important.
3. The omitted categories in the dummy variable analyses are: female sex; married; plains; not healthy; in normal or worse than normal mood; current living standard the same as five years ago; main reference group within village; household at average village income.
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, Instrumental variables and GMM: Estimation and testing. *Stata Journal* 3(1): 1-31.
6. The models have been clustered at village level for robust standard errors.

Table 5

Determinants of Two Different Concepts of Subjective Well-Being: Satisfaction with Life and Satisfaction with Income: OLS Estimation

	Mean or proportion	Satisfaction with life (1)	Satisfaction with income (2)	Satisfaction with life (3)	Satisfaction with income (4)	Satisfaction with life (5)	Satisfaction with income (6)
Log of per capita household income ('000 Yuan)	7.58	0.210702***	0.312683***	0.234759***	0.350699***	0.153428***	0.225788***
<i>Aspirations variables</i>							
Log of per capita minimum income needed	7.07			-0.081381***	-0.097470***	-0.063265***	-0.080140***
Lived outside township for at least a year	0.13					-0.043176	-0.113395***
Expect big increase in income over next 5 years	0.10					0.192728***	0.452823***
Expect small increase in income over next 5 years	0.67					0.058212**	0.112581***
Expect decrease in income over next 5 years	0.04					-0.144630***	-0.252268***
Agreement with statement that money is important	2.35					-0.036981***	0.033027**
Household income much above village average	0.02					0.259189***	0.365735***
Household income above village average	0.18					0.082069***	0.334325***
Household income below village average	0.20					-0.321823***	-0.484691***
Household income much below village average	0.03					-0.802952***	-0.835537***
Current living standards better than 5 years ago	0.60					0.201302***	0.262070***
Current living standards worse than 5 years ago	0.05					-0.089702**	-0.215369***
<i>Basic variables</i>							
Age (years)	45.26	-0.011127*	0.004377	-0.009889	0.003688	-0.015145**	-0.005835
Age squared	2159.52	0.000182***	0.000077	0.000170**	0.000086	0.000232***	0.000194*
Male	0.75	-0.076420***	-0.045872	-0.083351***	-0.053266	-0.082530***	-0.048937
Married	0.95	0.129819*	0.102162	0.148818**	0.133803	0.139821**	0.130847
Divorced	0.00	-0.454367**	0.133685	-0.423336**	0.231453	-0.477544***	0.15722
Widowed	0.02	-0.294919***	-0.011493	-0.299207***	0.023942	-0.220053**	0.147304
Ethnic minority dummy	0.14	0.005226	-0.048125	0.004878	-0.052955	0.017204	-0.040429

Education (years)	7.14	0.011366***	0.00456	0.014335***	0.007927	0.008412**	0.002299
Working hours ('00 per year)	17.07	-0.003303***	-0.001186	-0.003072***	-0.000678	-0.002391**	-0.000018
Net financial assets ('000 Yuan)	5.52	0.001798**	0.006408***	0.001576**	0.006269***	0.001384*	0.006322***
In good health	0.74	0.432416***	0.401851***	0.423018***	0.396571***	0.344800***	0.269207***
In a good mood	0.65	0.566490***	0.413522***	0.566889***	0.401661***	0.431142***	0.200472***
Constant		0.367140**	-1.481336***	0.701449***	-1.108986***	1.467268***	-0.104261
R-squared		0.225	0.119	0.231	0.124	0.308	0.222
Number of observations		6820	6820	6617	6617	6538	6538

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. Score of satisfaction with income based on cardinal values assigned to qualitative assessments as follows: very satisfied=4; satisfied=3; so-so=2; not satisfied=1 and not at all satisfied=0. The mean values of happiness and satisfaction with income are 2.63 and 1.92, their standard deviations 0.88 and 1.22 and their coefficients of variation 0.33 and 0.63 respectively.

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; 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 respectively.

Table 6

Robustness Checks for Determinants of Subjective Well-being with Income and Income Need Instrumented

	(1)	(2)	(3)	(4)	(5)	(6)
	Satisfaction with life	Satisfaction with income	Satisfaction with life	Satisfaction with income	Satisfaction with life	Satisfaction with income
Log of per capita household income (‘000 Yuan)	0.545654***	0.586389***	1.104873	0.613933*	0.307646	0.51212
<i>Aspirations variables</i>						
Log of minimum per capita income needed			-0.346743	-0.420769	-0.094068	-0.348847
Lived outside township for at least a year					-0.05093	-0.098531**
Expect big increase in income over next 5 years					0.179092***	0.424590***
Expect small increase in income over next 5 years					0.069713**	0.096600**
Expect decrease in income over next 5 years					-0.156411***	-0.271825***
Agreement with statement that money is important					-0.051366**	0.051703*
Household income much above village average					0.194926**	0.331364***
Household income above village average					0.054872*	0.318936***
Household income below village average					-0.292942***	-0.435114***
Household income much below village average					-0.737081***	-0.705555***
Current living standards better than 5 years ago					0.179919***	0.248583***
Current living standards worse than 5 years ago					-0.07863	-0.172988*
<i>Basic variables</i>						
Age (years)	-0.020892***	0.001414	-0.022530*	0.005999	-0.019203***	-0.005699
Age squared	0.000268***	0.00009	0.000263**	0.000058	0.000274***	0.000185
Male	-0.027631	-0.010087	-0.028222	-0.042921	-0.066467**	-0.029087
Married	0.136197*	0.153966		0.170663	0.133112	0.168692
Divorced	-0.455392**	0.062003		0.326849	-0.483547**	0.246059
Widowed	-0.294551***	0.059015		0.049412	-0.228856**	0.15776
Ethnic minority dummy	0.099153**	0.047205	0.23907	-0.004129	0.053007	0.01268

Education (years)	0.001503	-0.007693	-0.009038	0.01024	0.006353	0.003276
Working hours ('00 per year)	-0.005866***	-0.003019	-0.007579	-0.00125	-0.002877**	-0.001029
Net financial assets ('000 Yuan)	-0.003038	0.002624	-0.01088	0.002853	-0.000811	0.002778
In good health	0.416368***	0.408205***	0.378415*	0.352982***	0.344245***	0.244761***
In a good mood	0.523884***	0.396040***	0.460024***	0.365839***	0.418685***	0.184073***
Constant	-1.788585**	-3.402001***	-3.143911	-0.842698	0.689295	-0.397893
Number of observations	5879	5879	3896	6617	5620	6538

Significance of exclusion restrictions for ln of per capita household income in first stage equation

Father's years of education	**	**	*		**	
Mother's years of education						
Spouse's years of education			***			
Productive assets	***	***				
Senior citizens, male, aged 65+				***	***	***
Senior citizens, female, aged 65+				***	***	***
Adult males of 18 to 64 years				***	***	***
Adult females of 18 to 64 years				***	***	***
Teenaged males of 11 to 17 years				***	***	***
Teenaged females of 11 to 17 years				***	***	***
Children, males less than 11 years				***	***	***
Children, females less than 11 years				***	***	***
F-test of excluded instruments (P-val)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Significance of exclusion restrictions for ln of need minimum income in first stage equation

Father's years of education			ns			
Mother's years of education						
Spouse's years of education			***			
Productive assets						
Senior citizens, male, aged 65+				***	***	***
Senior citizens, female, aged 65+				***	***	***

Adult males of 18 to 64 years				***	***	***
Adult females of 18 to 64 years				***	***	***
Teenaged males of 11 to 17 years				***	***	***
Teenaged females of 11 to 17 years				***	***	***
Children, males less than 11 years				***	***	***
Children, females less than 11 years				***	***	***
F-test of excluding instruments (P-val)			0.0000	0.0000	0.0000	0.0000
Sargan test for overidentification of all instruments (P-val)	0.8043	0.7140		0.3314	0.2213	0.1864
Anderson Rubin test of joint significance of endogenous regressors in main equation, F test (P-val)	0.0002	0.0107	0.0009	0.0019	0.0011	0.0061

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. Score of satisfaction with income based on cardinal values assigned to qualitative assessments as follows: very satisfied=4; satisfied=3; so-so=2; not satisfied=1 and not at all satisfied=0.

2. Both ln per capita household income and ln minimum income needed have been instrumented.

3. Independent variables with cardinal values assigned to qualitative assessments so that a higher value denotes greater intensity: agreement that money is important.

4. 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.

5 ***, **, and * denote statistical significance at the one per cent, five per cent and ten per cent levels respectively.

6. Instrumented variables regression results generated using Baum et al's (2003), ivreg2.ado programme for Stata. See, Baum et al. (2003).

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