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**Individual Well-being in Urban China:  
The role of income expectations**

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**Abstract**

Using household survey data, we study the determinants of individual well-being in urban China, emphasizing particularly the role of income expectations. First, we find that individual well-being increases contemporaneously with own income and decreases with community's average income, consistent with findings reported in previous studies. This result holds when we replace income with consumption and when we consider employment and health status of other family members. Second and more important, we find that income expectations have a positive and significant effect on individual well-being. This result is robust to alternative model specifications and to controls for optimistic personality. Instrumental variables estimates and endogeneity tests suggest that the positive relationship between well-being and income expectations is genuine. Our finding has the potential to explain why reported well-being has declined in China despite the spectacular economic growth in the past decades.

**Keywords:** happiness; well-being; income expectations; transition economies

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## 1. Introduction

Despite the spectacular economic growth in the past decades, subjective well-being in China, measured by self-reported life satisfaction and happiness, has declined. According to the World Values Surveys, the average life satisfaction score fell from 7.29 in 1990 to 6.53 in 2001, and the share of the population expressed themselves as very happy dropped from 28.3% to 11.5% over the same period.<sup>1</sup> What could account for this decline in well-being while per capita income increased at unprecedented rates in China? One possible explanation, as suggested by Brockmann et al. (2009), is worsening relative deprivation—income distribution has become increasingly skewed to the right and the share of population below the average income has increased. As more people felt deprived in a relative sense and became less happy, the average well-being deteriorated. Another possible explanation relates to rising unemployment and dismantling of the social safety net, two features commonly observed in transition economies.<sup>2</sup>

Rising unemployment and lack of social safety net can harm individual well-being by lowering both current and expected future consumption. First, they lower income expectations and heighten the need for precautionary saving, which reduces current consumption. For the unemployed, lower current income also reduces current consumption. Second, lower income expectations reduce expected future consumption. If the share of the population who do not expect improvement in their future economic status rises, the average well-being level could fall. Indeed, the urban household survey that we use in our empirical estimation suggests that for many Chinese households income expectations might have worsened over time: in 2002 less than 25% of the sample households reported no change or decrease in household income over the period 1998 to 2002 but about 50% of them expected their incomes to remain stagnant or decline in the next five years (2002 to 2007).<sup>3</sup> As a first step in establishing income expectations as a potential cause for the falling well-being in China, we focus on the question: whether and to what extent do income expectations affect individual well-being?

This paper is closely related to two existing studies. The first is Knight and Gunatilaka (2011) who using Chinese survey data find a positive effect of expected future income on

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<sup>1</sup> See Inglehart et al. (2008), and World Values Surveys 1990 and 2001. Life satisfaction is measured on a scale from 1 (low) to 10 (high).

<sup>2</sup> Easterlin (2009) suggests these two factors, along with rising income inequality, as the underlying reasons why well-being has declined in China. However, he did not offer any explanation on how or channels through which these factors affect individual well-being.

<sup>3</sup> We do not have information on income expectations in 1998. However, under rational expectations the expected and realized incomes would not be systematically different.

happiness. Unfortunately, they do not address the critical issue that the correlation between happiness and expected future income may be spurious. The second paper is Frijters et al. (2012).<sup>4</sup> They estimate the effect of income expectations on reported happiness for three distinct population groups: urban residents, rural residents, and rural-urban migrants. They find a positive relationship between happiness and income expectations and that the relationship is particularly pronounced for the urban population. However, as they address the endogeneity issue concerning income expectations for only the rural sample, their estimates for the urban population may still be biased. While our study shares several common features with Frijters et al., such as the main research question, data used, and conclusion, we employ a vastly different empirical strategy, including the choice of instruments and various robustness tests, and we focus on the effect of income expectations on happiness in the urban sector. Therefore, our study and Frijters et al. are complementary to each other.

There is a plethora of human behaviors suggesting that future matters to people—we save a share of our income for future consumption; we invest in education to enhance our future earning potential; we purchase insurance to protect our properties. Yet the economic literature on happiness has largely overlooked income expectations as a potential determinant of individual well-being until the two aforementioned studies. Several previous studies have reported results that can be interpreted as indirect evidence indicating that income expectations affect individual well-being. For example, Di Tella *et al.* (2003) find that an increase in unemployment rate not only affects the well-being of those who are out of work but also reduces reported happiness of those who are employed, and that unemployment benefits are positively associated with reported happiness of those who are employed, not just the unemployed. These findings indicate that employment prospects and unemployment insurance affect well-being via expected future income. Senik (2004) shows that in Russia, in contrast with studies using data from non-transition economies, the reference group's income has a positive effect on individual well-being. Senik argues that the reference group's income may serve as a basis for people to form expectations about their future income, implying that individuals are forward looking and their well-being depends on not only their current income but also expected future income. Using 10

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<sup>4</sup> We thank John Knight for bringing to our attention the working paper version of Frijters et al. (2012) and a few other relevant papers, which we missed in the literature review of an early draft of the paper.

waves of the Russian Longitudinal Monitoring Survey, Senik (2008) offers further empirical evidence for the positive welfare effect of income expectations.

There are at least two theoretical underpinnings for income expectations to affect happiness. One is conventional models of inter-temporal choice in which forward-looking agents make consumption and investment decisions to maximize the discounted utility. In this framework, an increase in expected future income raises the discounted utility by raising current and future consumption. If borrowing constraint is present, an increase in expected future income affects the discounted utility only through expected future consumption. A second theoretical support relates to the model developed by Loewenstein (1987), in which individuals derive utility not only from current consumption but also from anticipating future consumption. This model implies that expected future income affects utility via the “thought” of future consumption *per se*. While there is much empirical evidence suggesting that reported happiness is a meaningful proxy for utility, whether happiness scores correspond to discounted or experienced utilities is an open question. There is nothing explicitly built into typical surveys to rule out the possibility that respondents’ income expectations play a role in influencing their answers to the happiness question.<sup>5</sup> Instead of debating which utility concept best matches the self-reported happiness, we test directly whether there is a positive relationship between expected future income and well-being.

China is particularly suitable for testing the impact of income expectations on individual well-being. Under the central planned system and even during the first ten years of economic reforms, Chinese urban workers had free health care and subsidized housing provided by state-owned enterprises, and free education provided by the state. As part of the reform efforts, these social welfare programs have largely been abolished, and a new social safety net has yet been established. Because of the rising private burden of expenditures on these increasingly more expensive services, expected future income as the main income source for future consumption is likely to become more important than before for individual well-being.<sup>6</sup>

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<sup>5</sup> In the World Values Survey, respondents in 81 countries are asked, “Taking all things together, would you say you are very happy, quite happy, not very happy, not at all happy, or don't know?” In the General Social Survey, respondents in U.S. are asked, “Taken all together, how would you say things are these days? Would you say that you are very happy, pretty happy, or not too happy?”

<sup>6</sup> Chamon and Prasad (2010) report that the average urban household saving rate in China rose by 7 percentage points from 1995 to 2005. They suggest that the rising private burden of expenditures on health care, education, and housing services is the main reason.

To estimate the effect of income expectations on happiness, we expand the happiness regression equation commonly employed in the literature to include measures of expected changes in household future income.<sup>7</sup> To address the concern that the correlation between expected future income changes and happiness may be a sheer reflection of optimistic or pessimistic personality, we experiment with two alternative proxies to control for it. We also identify an exogenous source for changes in income expectations to obtain IV estimates. As robustness checks, we estimate and compare the effect of expected future income on happiness for people in different age groups and for people with different levels of family wealth.

To establish a link with much of the empirical literature on happiness, we begin with estimating the conventional happiness equation and make four noteworthy contributions to the literature. First, while existing studies based on Chinese data rely on a subjective measure of income position to account for the effect of income comparison on happiness, we also use an objective measure (besides the subjective measure) that is constructed based on the reported household income. This is in line with conventional practice in the literature. Second, even though conceptually people derive utility from consumption rather than income, most happiness studies (including those based non-Chinese data) use income as a proxy for consumption. With information on household consumption, we provide a robustness check on the income-based estimates of ours and those reported in the literature. Third, we also allow one's well-being to be affected by the employment and health status of other family members because of within-household resource pooling and altruism.<sup>8</sup> Fourth, aside from including a rich set of individual, household, and city characteristics as controls to mitigate the omitted variables bias problem, we also obtain IV estimates treating household income and city average household income as endogenous variables. Our IV strategy is similar, in spirit, to the one adopted by Luttmer (2005).

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<sup>7</sup> This literature begins with Easterlin (1974) and includes Frank (1985), Inglehart (1990), , Easterlin (1995), Clark and Oswald (1996), Oswald (1997), Konow and Earley (2008), Van Praag et al. (1999), , Alesina, Di Tella, and MacCulloch (2004), Gardner and Oswald (2001), , Blanchflower and Oswald (2004), Ferrer-i-Carbonell (2005), Luttmer (2005), and Clark et al. (2008). Frey and Stutzer (2002) provide a review of the literature. In this paper we use happiness and well-being interchangeably. Most empirical studies use data from developed economies. Graham and Pettinato (2002), Lelkes (2006), Senik (2004), Frijters et al. (2004), Frijters et al. (2006), and Guriiev and Zhuravskaya (2009) are among a handful of studies using data from developing or transition economies.

<sup>8</sup> Several previous studies find that own unemployment and poor health status significantly depress reported happiness, holding other things constant. See, for example, Winkelmann and Winkelmann (1998), Blanchflower and Oswald (2004), Di Tella, MacCulloch, and Oswald (2001), and Frey and Stutzer (2002). Because of within-household resource pooling and altruism, an individual's happiness may also be affected by other family members' employment and health status.

We find that reported happiness increases with household income but decreases with city average household income, consistent with previous studies using data from China as well as from developed countries. Individuals who are unemployed or laid off are less happy. So are those who have health issues. Poor health condition of other household members also significantly reduces happiness of the respondent, while other household members' employment status does not, controlling for household income. Our consumption-based estimates are qualitatively in conformity with the income-based estimates. Income expectations have a significant effect on individual well-being: controlling for current household income (or consumption) and wealth, happiness increases with expected future income. Robustness tests and IV estimates show that our results are compelling.

The rest of the paper is organized as follows. In section 2, we discuss the survey data and key variables used in the empirical estimation. In section 3, we lay out our empirical models and estimation strategy. We present our estimation results and robustness checks in section 4. Section 5 concludes the paper.

## **2. Data**

The data used in this study come from the Chinese Household Income Project 2002, also known as CHIP2002. The survey contains distinct samples of the urban, rural, and rural-urban migrant populations of China selected from substantially larger nationally representative samples drawn by the National Bureau of Statistics of China. In the urban sample used in this study, ten provinces and two municipalities were chosen to represent the whole country. These are Liaoning and Shanxi in the north, Jiangsu and Guangdong as eastern coastal provinces, Anhui, Henan, and Hubei from the interior, Gansu, Sichuan, and Yunnan in the west, and Beijing and Chongqing as representatives of province-level municipalities.

The sample contains information on both households and their individual members for 2002. The individual data include detailed information on demographic characteristics, employment status, annual income, income and social security taxes, and health status. The annual income includes wages and salaries, self-employment income, investment income, and transfer income. Respondents with positive income in 2002 also reported their annual income in the previous four years. The health-related variables are constructed according to respondents'

reply to questions: if they had suffered any serious sickness in 2002 and if they had any serious chronic diseases or disabilities.

Household-level information includes nonmonetary income (in-kinds and services received), consumption expenditure in 2002, and asset and debt holdings as of the end of 2002. Household income used in this study is the sum of household disposable income, which is the sum of each member's annual income net of income and social security taxes,<sup>9</sup> and household nonmonetary income. Household consumption includes expenditures on food, clothing, household appliances and services, health care, transportation and communication, entertainment, education and culture activities, rent for housing or implicit rent for owner-occupied housing, and other goods and services. Assets include financial assets, durable goods, productive fixed assets, real estate assets, and other assets, and are measured at the current market value. Debt holdings include bank loans and other borrowings.

The household head or one main household member also provided answers to several subjective questions regarding happiness, perceived position of their household living standards, and expected changes in household income over the next 5 years. Happiness is measured on a five-point scale depending on the answer to the question: "Generally speaking, do you feel happy?" with 1 for "not happy at all", 2 "not very happy", 3 "so-so", 4 "happy" and 5 "very happy". Individuals who did not answer this question or answered "Don't know" are excluded from our sample.<sup>10</sup> Figure 1 shows the distribution of reported happiness. The majority of the respondents feel happy or very happy, with about 7% being very happy and 49% happy. Approximately 31% of the respondents reported feeling just so-so, and the remaining 13% being not very happy or not happy at all. The mean happiness score is 3.48. Table 1 presents summary statistics of the variables used in our study, and the Appendix contains their definitions.<sup>11</sup>

### **3. Empirical Model and Strategy**

The empirical model we adopt in this study is similar to those widely used in the literature. In our baseline model, reported happiness is expressed as a function of log own per capita household income, log average per capita household income in the respondent's city of

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<sup>9</sup> In our regression analyses, we also experimented with the household income based on individual pre-tax incomes and obtained substantively the same results as those reported in section 4.

<sup>10</sup> Only 65 observations are excluded, which account for about 1% of the sample.

<sup>11</sup> The original survey questionnaires and data are available at the Interuniversity Consortium for Political and Social Research (ICPSR).

residence, and other factors. Household and city average household incomes capture, respectively, the effects of own income and relative income comparison on happiness. The model can be written as:

$$(1) \quad \begin{aligned} Happiness_{ihc} = & \beta_0 + \beta_1 \log(hhincome_{hc}) + \beta_2 \log(avghhincome_c) + \beta_3 X_{ihc} \\ & + \beta_4 X_{hc} + \beta_5 X_c + v_p + u_{ihc} \end{aligned}$$

where *hhincome* denotes household income per person, *avghhincome* denotes average city household income per person, *i* indexes individual, *h* household, *c* city, and *p* province. Happiness is measured on a 1-to-5 scale with 5 being very happy. The individual-specific variables  $X_{ihc}$  include the respondent's demographic characteristics, employment status, hours of work, and health condition. The household-specific variables  $X_{hc}$  include net worth, net debt (in case the net worth is negative), family size, employment status and health condition of other household members, and household income volatility which is measured by the standard deviation of log per capita household income from 1998 to 2002. The city-specific variables  $X_c$  include measures for city employment environment, housing price level, and income inequality which is measured by the standard deviation of log per capita household income in 2002. The term  $v_p$  is a set of province dummy variables to control for province-specific and time invariant factors, such as climate and ethnic diversity of the population, and  $u_{ihc}$  is a random error term. We also estimate the effect of consumption on happiness using the same regression specification but replacing per capita household income and city average per capita household income with per capita household consumption and city average per capita household consumption, respectively. For ease of interpretation as well as following much of the empirical literature, we present results based on the ordinary least squares and two stage least squares methods. The estimates based on ordered logit regressions warrant substantively the same conclusions.<sup>12</sup>

Even though we include a rich set of individual, household, and city characteristics as controls, household income and city average household income may still correlate with some omitted variables at different levels. The income variables may also be susceptible to reporting errors. Both will render our estimates inconsistent. To address this concern, we use predicted household income and city average household income as instruments to obtain IV estimates. These instruments are derived for each household and city from the predicted individual income

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<sup>12</sup> Ferrer-i-Carbonell and Frijters (2004) find that assuming cardinality or ordinality of happiness is relatively unimportant to results. The ordered logit estimates are available from the authors upon request.

based on an income equation that includes education, age, industry and occupation as the explanatory variables.<sup>13</sup> In spirit, this method is similar to the one adopted by Luttmer (2005). In this IV strategy, identification mainly comes from variations in household income and city average income that are due to variations in industry-occupation mix of household members and in industry-occupation composition of the city population. The IV estimates also help purge the possibility that city average household income simply picks up the effect of city-specific price levels (or costs of living).

In our baseline model, city average household income is used to capture the effect of relative income comparison. However, for our sample individuals the city population may not be the relevant social comparison group. As a sensitivity test of this potential misspecification problem we also use the perceived relative position of household living standard as an alternative measure of relative income position. While we do not know the composition of the comparison group for each of our sample individuals, since this measure is self-reported the comparison group should consist of people, such as neighbors, relatives, coworkers, occupation peers, who matter to the respondent. An additional advantage of this measure of relative income position is that it allows us to implement city fixed-effect regressions to gain a better control for city-specific characteristics that may be correlated with both average income and reported happiness.

An important contribution of our study is to examine the role of expected future income in influencing reported happiness. There is evidence in our sample that unfavorable expectations about the future are important reasons for unhappiness. In the survey, the respondents who reported either ‘not very happy’ or ‘not happy at all’ were asked to give the main reason for being unhappy. Among them, 11.6% cited future life instability and 17.3% cited unemployment and layoff (*xiagang*) as the main reason.<sup>14</sup> About one third of the respondents in the latter group had no household members, including themselves, who were unemployed or laid off at the time of the survey, which indicates that the possibility of becoming unemployed in the future depresses individual well-being.

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<sup>13</sup> To construct the IVs, we regress individual annual pretax income on educational dummy variables, age and age squared, 11 occupation dummies, and 16 industry dummies. In the survey, people who were unemployed (including *Xiagang*) or retired at the end of 2002 were asked the industry and occupation of their last job. We cannot use industry  $\times$  occupation dummies, because many industry  $\times$  occupation cells have very few observations or are empty in the sample. We use the predicted individual annual income to construct predicted household average income and city average household income.

<sup>14</sup> Low income (current) was cited by 52.4% of these respondents as the main reason for being unhappy or very unhappy. Other reasons include: poor health, family conflicts, personal issues, and others.

A straightforward way of estimating the effect of expected future income on happiness is to introduce a measure of it into equation (1) as an additional explanatory variable,

$$(2) \quad \begin{aligned} \text{Happiness}_{ihc} = & \beta_0 + \alpha \log(\text{fhhincome}_{hc}) + \beta_1 \log(\text{hhincome}_{hc}) \\ & + \beta_2 \log(\text{avghhincome}_c) + \beta_3 X_{ihc} + \beta_4 X_{hc} + \beta_5 X_c + v_p + u_{ihc}, \end{aligned}$$

where *fhhincome* denotes expected future income, and the coefficient  $\alpha$  measures the effect of expected future income on happiness. If expected future income is expressed as a percentage of current income, i.e.,  $\text{fhhincome}_{hc} = \text{hhincome}_{hc} * (1 + g_{hc})$  where  $g_{hc}$  is the expected income growth rate, equation (2) can then be written as,<sup>15</sup>

$$(3) \quad \begin{aligned} \text{Happiness}_{ihc} = & \beta_0 + \alpha g_{hc} + (\alpha + \beta_1) \log(\text{hhincome}_{hc}) \\ & + \beta_2 \log(\text{avghhincome}_c) + \beta_3 X_{ihc} + \beta_4 X_{hc} + \beta_5 X_c + v_p + u_{ihc}. \end{aligned}$$

The effect of expected future income can be estimated from equation (3) as well. But the coefficient on current income can no longer be interpreted as the effect of current income as in equations (1) and (2). However, we do not have information on either expected future income or the expected income growth rate. What we have is information on individual expectation on future income changes. One of the survey questions asks the respondents: ‘How do you think of your household income in the next 5 years?’.<sup>16</sup> Among the sample respondents, 2.3% of them expected a large increase in their household income, 46% expected a small increase, 32.7% expected no change, and the remaining 19% expected a decline. We construct a set of four dummy variables based on the respondents’ answer to this question, and use them to replace  $g$  in equation (3). As long as a large increase in expected future income is quantitatively greater than a small increase for individuals with the same current household income, the coefficients on our dummy variables can be interpreted as the effect of expected future income on reported happiness.<sup>17</sup>

There are three concerns with using our income expectation variables to identify the effect of expected future income on happiness. First, income expectations may merely be a reflection of optimistic personality. If people who have a more positive outlook about life or are

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<sup>15</sup> Note,  $\log(1+g) \approx g$ .

<sup>16</sup> Although the English translation of the questionnaires provided by the ICPSR reads ‘How do you think of your income in next 5 years?’ the question asked in Chinese is about their household income.

<sup>17</sup> This is analogous to using education dummy variables, instead of schooling in years, to estimate the effect of education on earnings. We also experimented with three dummy variables by combining the top two categories in all our regressions and obtained estimates that warrant the same conclusion.

more optimistic tend to report, *ceteris paribus*, larger increases in future income, the income expectation variables would capture the effect on happiness of not only expected future income but also personality. To address this concern, we control optimistic personality with proxies indicating if an individual's perceived income position is higher than his actual income position (or the average perceived income position of individuals with comparable household income). The underlying assumption is that optimistic people tend to overestimate their future prospect as well as their present relative position. The second concern is that income expectations may pick up partly the effect of income changes in the past on happiness, because people may form their income expectations for the next five years based on their past experience. If what happened in the past also contribute to present well-being, the estimates associated with future income expectation would be inconsistent (upwardly biased). We control for the effect of past income changes by including a variable measuring income changes several periods prior to our sample year. The third and more general concern is omitted variables bias. If both happiness and income expectations are correlated with some unobserved individual and family characteristics (other than optimistic personality), OLS estimates would still be inconsistent. We tackle this problem using instrumental variables approach. Our instruments are employment contract type and profitability of the employing firm, pertaining particularly to other members of the respondent's household. The working assumption is that these variables play a part in shaping expectations of future family income but do not directly influence happiness of the respondent. Tests of overidentifying restrictions validate this assumption.

## **4. Results**

### **4.1 Effects of own and relative income (consumption) on happiness**

Table 2 reports OLS and IV estimates of equation (1). The estimates in column 1 show that holding other things constant, a 10% rise in household income increases reported happiness by 0.0338, of which 0.0043 or 13% is attributable to the absolute income effect and 0.0295 or 87% is attributable to improved income position relative to the average income of the city population, i.e., the relative income effect.<sup>18</sup> This indicates that increases in income improve individual well-being mainly through improvement in the relative income position. The estimate of the city

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<sup>18</sup> We fail to reject the null hypothesis that the sum of the coefficients on log per capita household income and log city average per capita household income equals zero at the 10% level.

average income indicates that *ceteris paribus* a 10% increase in fellow citizens' household income reduces an individual's happiness score by 0.0295. These estimates seem small but they are largely in line with those reported in previous studies for developed countries (see, for example, Blanchflower and Oswald (2004) and Luttmer (2005)).

The estimates associated with other covariates in column 1 are generally consistent with those reported in many previous studies as well. Males are less happy than females. Happiness first declines and then rises with age, with the turning point occurring at around age 46. Several other individual characteristics also obtain significant estimates. Compared with those never married, divorcees are less happy. Unemployment, layoff, disability and poor health all reduce happiness. Among the household characteristics, net worth increases happiness while net debt (i.e., negative net worth) depresses happiness unless it is related to mortgage.<sup>19</sup> Having household members currently unemployed or with poor health reduces happiness; so does volatility of household income in recent years.<sup>20</sup> Household size, on the other hand, is a positive contributing factor to happiness.

The city-specific characteristics include (1) employment shares of the government, institution, business enterprise, and other sectors; (2) employment shares of seven ownership sectors; (3) average rental rate of residential housing; (4) income inequality, measured by the standard deviation of the log per capita household income. Our estimates show that only the relative sizes of the enterprise and institution sectors are positively and significantly associated with individual happiness. All other city-specific factors included in the regression obtain insignificant coefficient estimates. It is worth noting that an increase in the average rental price of residential properties or in income inequality in the city reduces individual happiness, albeit insignificantly.

Despite the three sets of control variables included in column 1, omitted variables bias remains a potential problem. Moreover, if household income and city average household income are measured with errors, the estimated effects of household income and city average household income would be subject to attenuation bias. To address these concerns, we use the predicted

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<sup>19</sup> A very small share of our sample households reported to have debts more than assets, and therefore their net worth is negative. Since net worth enters the regression in the log form, we set the log of net worth to zero for household with negative net worth. We account for the effect of net debt position by the log of the absolute value of net debt, which assumes the value of zero for household having positive net worth. We also experimented with using net worth in level form and found that our main results remain virtually the same.

<sup>20</sup> The income volatility is measured by the standard deviation of log per capita household income from 1998 to 2002.

household income and city average household income as instruments for household income and city average income, respectively. This choice of IVs was discussed in the previous section.

We first conduct the Hausman test to determine if the two income variables are exogenous. The test rejects the null hypothesis that household income is exogenous, but fails to reject the exogeneity of city average household income. There are at least two possible reasons for city average household income to be exogenous. First, the presence of the household registration (*Hukou*) system limits to a large extent people's ability to choose where to live and work.<sup>21</sup> Therefore, place of residence is not likely to be the outcome of a sorting process through which happy and unhappy individuals or well-to-do and low income households are segregated into different cities. Second, the city-specific variables that we include in the regression equation may have adequately accounted for city-specific characteristics that correlate with both city average income and individual well-being. Column 2 presents the IV estimates treating only the household income as an endogenous variable. The IV estimates for household and city incomes are substantially larger (in absolute terms) than the OLS estimates reported in column 1, suggesting that measurement errors, rather than endogeneity, associated with the household income variable are likely to be the main source of bias in the OLS estimates. However, to the extent that the IV estimates are in line with the OLS estimates both qualitatively and in terms of statistical significance, they support the inferences that happiness rises with own household income but falls with others' income. Another noticeable change is that employment status of other household members is no longer a significant determinant of happiness.

In our estimations, we use city average household income to capture the effect of relative income comparison. However, it is possible that city population is not the relevant group with which our sample individuals compare themselves. To test the robustness of our results, we use an alternative measure: the perceived position reported by the respondents. In the survey, the respondents were asked to identify the quartile that they believe their households are positioned in the distribution of living standards across households in the city. Although this perceived position is positively correlated with the actual household income position within the city, only 0.79% and 11.06% of the respondents believe their household living standards belong in the bottom 25% and the top 25%, respectively. Most of the respondents place their households in the middle 50%: 55.81% in the second lowest quarter and 32.34% in the third lowest quarter,

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<sup>21</sup> See, for example, Liu (2005).

respectively. We combine the top two groups because of small cell size of the top 25% category. As a result, the perceived position is measured with three dummy variables: bottom quarter, second quarter, and above median.<sup>22</sup> There are two advantages associated with using the perceived position to capture the relative income effect. First, the comparison group is individual specific and, therefore, is more relevant. Second, as the perceived position varies across individuals within the same city, we can now use city fixed effects to control for city-specific and time-invariant factors (such as infrastructure and amenities) that affect individual well-being.

In columns 3 and 4 of table 2, we repeat columns 1 and 2 replacing city average household income with the perceived position. The estimates suggest that happiness increases with the perceived position and moving up from a lower to a higher perceived position results in statistically significant improvement in reported happiness.

Conceptually happiness, as an empirical counterpart of utility, depends on consumption. However, most of the existing studies examine the relationship between happiness and income partly because of the lack of consumption data. The survey data we use contain detailed information on household consumption, making it possible for us to estimate the effect of consumption on happiness and compare it with the income-based results. Column 5 replicates columns 1 with household income and city average household income replaced by household consumption and city average household consumption. Similar to the income-based results, the estimates reported in column 5 show that happiness is positively and significantly associated with household consumption, but negatively and significantly associated with city average consumption. The estimates associated with other covariates are by and large in line with those obtained from the income-based regression reported in column 1. Overall, the consumption-based estimates are qualitatively in conformity with the income-based estimates and therefore they validate the practice of using income as a proxy for consumption in most of the previous studies.<sup>23</sup>

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<sup>22</sup> Obviously, the perceived and actual positions differ. One possible explanation is that the perceived position is established in reference to one's social network consisting of a group of people much smaller than the city population. To the extent that people in a social group are likely to be more homogenous, perceived position tend to gravitate toward the middle. Even though the survey question asked the respondents about their income position relative to all city residents, they may still compare themselves with people within their social network, because either they do not have the information on the actual city average income or they use the income of the people they know as the estimate of the city average income.

<sup>23</sup> Like the income variables, the consumption variables may also be endogenous. However, proper instruments are hard to come by. When we instrument household consumption and city average consumption using the same

## 4.2 Effects of expected future income on happiness

### 4.2.1 Basic results

In table 3, we expand the happiness regression equation to include measures of income expectations, which we believe affect individual well-being through expected future consumption, given current consumption or income. Column 1 of table 3 expands column 1 of table 2 to include three dummy variables, namely large increase, small increase, and decrease, indicating the expected changes of household income in the next five years. The estimates show that, everything else being the same, happiness increases with expected future income. Specifically, compared with those who expect no change in household income, individuals who expect large income increases are on average 0.437 happier, those who expect small increases are 0.143 happier, and those who expect decreases are 0.344 less happy.

In columns 2 to 6 we investigate whether there are any omitted city, household, and individual characteristics that could be driving the results in column 1. To gain a better control of unobserved city-specific characteristics, we run city fixed-effects regressions. In this case the effect of city average household income is absorbed by the city dummy variables. This should not be a concern because our primary interest in this section is to estimate the impact of income expectations on happiness. As the corresponding estimates in columns 1 and 2 are very similar, our estimates are not sensitive to unobserved city-specific factors. In column 3 we consider endogeneity and measurement errors associated with the reported household income. As in the previous subsection, we use the predicted household income as the instrument for household income. The IV estimates of column 3 show that the estimated effects of expected future income remain significant at the 1% level and are comparable to the OLS estimates of the previous column.<sup>24</sup>

It is possible that optimistic people are generally happier and more likely to overestimate their expected future income, and pessimistic individuals are less happy and more likely to underestimate their expected future income. Such correlation between expected future income and optimistic personality could cause an upward bias (in absolute terms) in the estimates for

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instruments we used for incomes, we obtain IV estimates of 1.411 and -0.810 respectively for own and city average household consumptions. The IV estimates are statistically significant at the 1% level.

<sup>24</sup> Similar to the estimates reported in table 2, the IV estimate for household income and its standard error are larger than their OLS counterparts.

expected future income. To address this concern, we experiment with two proxies to control for optimistic personality. As mentioned earlier, the survey respondents were asked of the perceived position of their households' living standards in the city. Assuming that optimistic (pessimistic) individuals tend to overestimate (underestimate) their current relative position, we can approximate optimistic personality by whether the perceived income position deviates from some objective benchmarks of income position. One plausible benchmark is the actual household income position which equals 4 if it belongs in the top 25% of the household income distribution in the city, equals 3 and 2 respectively for the middle two 25%, and equals 1 for the bottom 25%. We define our first proxy for optimistic personality (*Trait1*) as the difference between an individual's perceived income position and his actual household income position in the city. For example, for an individual with the perceived income position in the top 25% and actual income position in the bottom 25%, *Trait1* has the value of 3 (4 minus 1). By definition this is the most optimistic person. For the most pessimistic person, *Trait1* equals -3. Column 4 shows that, when we control for optimistic personality using *Trait1*, the estimates for expected future income remain statistically significant and, as expected, become slightly smaller in absolute terms comparing to their counterparts in column 2.

However, as discussed above the perceived income position reported by the respondents may be in reference to people in their own social networks, rather than the city population. To take this possibility into account we construct an alternative proxy, *Trait2*, which is defined as the difference between the perceived income position and the average perceived income position of individuals in the same (actual) household income decile group in the city. Since households within the same income bracket are more likely to have similar comparison groups as well as similar perceived income positions, deviation of the perceived income position from the average perceived position of households within the same income bracket may be ascribed to difference in personality. The underlying assumption is that the average person in a particular income decile group is neither an optimist nor a pessimist, i.e., his perceived income position is the same as his actual income position. Similar as *Trait1*, *Trait2* is positive for optimists and negative for pessimists. As the estimates in columns 5 indicate, controlling for optimistic personality the

effects of expected future income on happiness remain positive and statistically significant.<sup>25</sup> One notable change resulting from the inclusion of either one of the proxies or both of them is that the null hypothesis that household income is exogenous can no longer be rejected, even at the 10% level--the  $p$ -values for the Hausman's tests are greater than 0.145. The results of the Hausman's tests are independent of whether the expected future income variables are included or excluded. This suggests that the endogeneity of household income in our previous regressions may stem largely from the omission of certain individual characteristics, particularly optimistic personality. When we rerun models of columns 4 and 5 treating household income as an endogenous variable, the estimates (not reported) associated with expected future income hardly change and the estimate for (current) household income becomes more comparable to the IV estimate reported in column 3.

As noted in subsection 4.1, a mere 0.79% of the respondents place their household living standards in the bottom 25%. This discrepancy between actual and perceived position for individuals in the bottom-quarter income group may be due largely to the fact that rural-urban migrants (who typically fare less well than their urban counterparts) are excluded from the urban household sample and urban residents do compare themselves with migrants. As a robustness check, we construct our personality proxy variables using a measure of actual income position that is calculated based on the urban sample plus 1935 migrant households for which income information is available. We rerun all the relevant regressions of table 3 using the new proxy variables and obtain virtually identical results.

To the extent that people may form expectations based on their past experience, the estimated effects of expected future income on reported happiness could be partly attributed to income changes in the past. We address this concern by adding as a control to the model of column 5 the average growth rate of household income during the five years prior to our sample period. As the estimates in column 6 show, this has virtually no effect on the coefficient estimates associated with expected future income. The past income-growth variable itself obtains an insignificant coefficient estimate.

In life cycle models, income expectations could affect discounted utilities through expected future consumption or current consumption or both. To have a clearer interpretation of

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<sup>25</sup> We also tried a regression in which both proxies for personality are included and obtained comparable estimates. It should be noted that *Trait2* leads to a larger improvement in  $R^2$  than *Trait1*. For this reason we use *Trait2* to control for optimistic personality in the rest of our regressions.

the effect of income expectations on happiness and to strengthen our arguments that expected future income matters to individual well-being, in columns 7 and 8 we control for (current) household consumption, instead of household income. These two columns use the same specification as columns 2 and 6, respectively. The results are consistent with those based on household income: holding current consumption constant, happiness rises with expected future income. It should be noted that in our sample while current household consumption is strongly correlated with current household income and wealth, the correlation between current consumption and expected future income is weak and statistically insignificant. This may suggest that the effect of expected future income on happiness is mainly through its influence on expected future consumption.

#### **4.2.2 IV estimates**

So far we have focused on optimistic personality as a source for omitted variables bias. However, it is conceivable that there are other unobserved individual factors that may be correlated with both income expectations and happiness. For example, if one expects a promotion in the near future he would also reasonably expect a pay raise, and the imminent promotion per se could make him happier. In this subsection, we use the method of instrumental variables to further tackle the omitted variables bias problem. The key to this approach is to find one or more variables that are correlated with expected future income but uncorrelated with the error term. Two variables seem to meet these requirements. The first is the type of employment contract, which ranges from permanent to temporary or short-term contract employment to self-employment. Workers who are employed on non-permanent contract face greater lay-off risk than those on permanent contract and therefore are more likely to expect decreases in future wage income. Thus, having one or more family members employed on non-permanent contract could negatively affect one's expectations on future household income. The second variable that could influence expected future (household) income is the profitability of the firm of employment. The survey asks all household members who are currently employed in business enterprises whether their firms are very profitable, marginally profitable, at loss or at the edge of bankruptcy. People working for loss-making (including nearly-bankrupted) firms are more likely to expect future wage decreases than increases and are more likely to become unemployed. Therefore, having one or more family members employed in loss-making firms could have a

negative impact on expected future household income. Since all household members, including the respondents themselves, provided information on employment contract and firm profitability, we have a total of four instruments—two pertaining to the respondents and two pertaining to other members of their households.

These four instruments are valid under the assumption that they affect happiness only through their influence on the formation of expectations on future household income. However, employment contract and firm profitability may have non-pecuniary values that correlate with self-report well-being. While we cannot completely rule out the existence of such correlations a priori, we believe that the non-pecuniary values of employment contract and firm profitability associated with other family members, if exists at all, would be far less than that associated with the respondents themselves. Therefore, we designate the two instruments pertaining to other family members our preferred instruments, although we also use all four instruments in selected regressions. It should be noted that overidentification restrictions tests suggest that all four instruments can be excluded from the happiness equation.

To lessen the demand on the number of instruments and to make overidentification restrictions tests possible, we measure expected future income changes with one variable, instead of four dummy variables. This variable—expected future income—is an ordinal variable and has a value ranging from 1 to 4, with 1 for expecting future income to decrease, 2 for no change, 3 for small increases, and 4 for large increases.

Table 4 presents the results treating expected future income as an endogenous variable. Note, first, the test statistics reported at the bottom of the table. The row titled HN shows the results of Hausman's tests concerning the endogeneity of expected future income. As the  $\chi^2$  statistics indicate, Hausman's tests reject at the 1% level the null hypothesis that expected future income is exogenous. The row titled OR contains the results of overidentification restrictions tests. These fail to reject at the 10% level the null hypothesis that our overidentification restrictions are valid. Also note that all instrumental variables exhibit significant predictive value in the first stage regressions. Consistent with our expectation, expected future income is found to be related negatively to non-permanent employment contract and loss-making status of employing firms.

In column 1 of table 4, where all four instruments are used, the estimated coefficient on expected future income is positive and statistically significant at the 1% level. The estimate,

0.974, implies that a one-unit increase in expected future income (for example, from expecting no change to small increases) could be associated with approximately a one-unit increase in happiness scores (for example, from happy to very happy), everything else being equal. Since the respondent's employment contract and employing firm's profitability may be partially correlated with his happiness, they may be problematic instruments. In column 2, we drop them from the set of instruments. The IV estimate for expected future income becomes slightly smaller but remains significant at the 1% level. Column 3 repeats column 2 with these two variables added as additional covariates in the structural equation. The estimated coefficient on expected future income hardly changes, with the estimated coefficients on the respondent's employment contract and firm profitability variables being statistically insignificant (separately and jointly). In column 4, we rerun the model of column 2 using a subsample that excludes respondents who are employed on non-permanent contract or are employed in loss-making firms. The use of this subsample helps moot the concern over whether own employment contract and firm profitability are correlated with the error term. In column 5 we replace household income with household consumption. Again, none of these two alternations to the model of column 2 leads to a discernable change in the estimated relationship between individual well-being and expected future income.

We also estimated the model of column 1 via the OLS method, i.e., treating expected future income as an exogenous variable. The estimated coefficient on expected future income is 0.197 (with a standard error of 0.015), which is smaller in magnitude than any of the IV estimates reported in table 4. This suggests that the OLS estimate tends to understate the positive relationship between individual well-being and expected future income. The fact that this result shows up even stronger in the IV estimation procedure gives increased confidence that the relationship is genuine.<sup>26</sup>

### **4.2.3 Robustness checks**

To investigate the robustness of our results, we test whether expected future income matters more for young individuals than older individuals. We expect the impact of future income to diminish with age because, comparing with older people, the young generally have accumulated

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<sup>26</sup> Perhaps, it is not a big stretch of imagination to argue, based on the IV estimates, that there is a causal effect running from income expectations to subjective well-being.

less wealth and will stay in labor force for longer time before becoming eligible for pension or social security benefits. If we find that expected future income is more important to the older than the younger generation, then that would cast doubt on the interpretation of the coefficients on expected future income as its effect on well-being. Panel A of table 5 presents the estimates for two age groups: those age 40 and under and those aged between 50 and 65.<sup>27</sup> The regression models adopted here are the same as those of column 6 or 8 of table 3 depending on if current household income or consumption is controlled for. Consistent with our expectation, both the city-fixed effects estimates show that the effect of expected future income on happiness is uniformly greater for the young than for the older individuals although the differences are statistically significant in only 2 out of 6 cases. These results are insensitive to controlling for current household income (columns 1 and 2) or consumption (columns 3 and 4).

We also expect the effect of expected future income to vary with household wealth. Individuals from wealthier households can count on family wealth besides future income to support future consumption and, as a result, their well-being is less responsive to expected future income than that of those from comparatively poor households. To highlight this asymmetric effect, we estimate the effect of expected future income for two groups of individuals: those whose household wealth is in the top one-third and those whose household wealth is in the bottom one-third. The city fixed-effects estimates are reported in Panel B of table 5. Without a single exception, controlling for current household income or consumption the estimated effect of expected future income on happiness is quantitatively larger for individuals with low household wealth than for individuals with high household wealth, albeit the cross-group differences in the corresponding estimates are statistically insignificant.

Table 6 presents IV estimates for the same comparison groups discussed in table 5. Differing from table 5, here expected future income is an ordinal variable (like in table 4). The instruments used are employment contract and firm profitability pertaining to the respondent's other family members. Compare first the results by age group reported in panel A. The IV estimates are significant only for the subsample of young individuals. Statistically speaking, this conforms with our expectation that the young's well-being is more responsive to income

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<sup>27</sup> Over 96% of the respondents are household heads or spouses of household heads. The distribution of the expected change in future household income is similar across these two age groups. Also, note the older age group consists of males between 50 and 65 and females between 50 and 60, with 65 and 60 being the retirement ages for males and females, respectively.

expectations. By contrast, the difference in IV estimates between the poor and the wealthy is much sharper. The estimated coefficient on expected future income for the poor is larger, both in magnitude and statistically, than that for the wealthy, independent of whether household income or consumption is controlled for.

## **5. Concluding remarks**

This study provides microeconomic evidence on the determinants of individual well-being using Chinese survey data. Overall, our results are in line with the findings reported in studies using data from developed countries and a few recent studies using data from China: happiness is positively associated with own household income but negatively associated with income position relative to others. Taking advantage of the detailed information on consumption in our data set, we also investigate the role of consumption and relative consumption position in affecting happiness. We find that the consumption-based estimates are qualitatively in conformity with the income-based estimates, validating the practice of using income as a proxy for consumption in most of previous studies.

A distinct feature of this study is that we extend conventional happiness regression models to study the role of expected future income. We find a positive and statistically significant relationship between reported happiness and expected future income changes. And this relationship appears to be independent of personality trait and experienced income changes in the past--two factors likely to affect an individual's income expectations, and robust with respect to estimation methods used. This suggests that income expectations matter to individual well-being.

The Chinese government has recently considered happiness or well-being indexes as a supplement to more traditional measures of development. There were proposals in China's more developed areas, such as Guangdong and Shanghai, to substitute a happiness index for gross domestic product as a measure for local development. This sudden emphasis on individual well-being in policy making is partly in response to persistent decline in subjective well-being indicator and rising social discontents among Chinese citizens, despite the spectacular economic growth in the past decades. Our main finding suggests that public policies and social programs (such as unemployment insurance) that help boost or stabilize income expectations are conducive to improvement in individual well-being.

Although we have included in our regression models a rich set of controls to account for household and individual-specific factors and obtained corroborating IV estimates, our results may still be susceptible to omitted variables bias because of the cross-sectional nature of the data used. Addressing this issue will be a necessary component of any future research attempting to estimate the effect of expected future income on individual well-being.

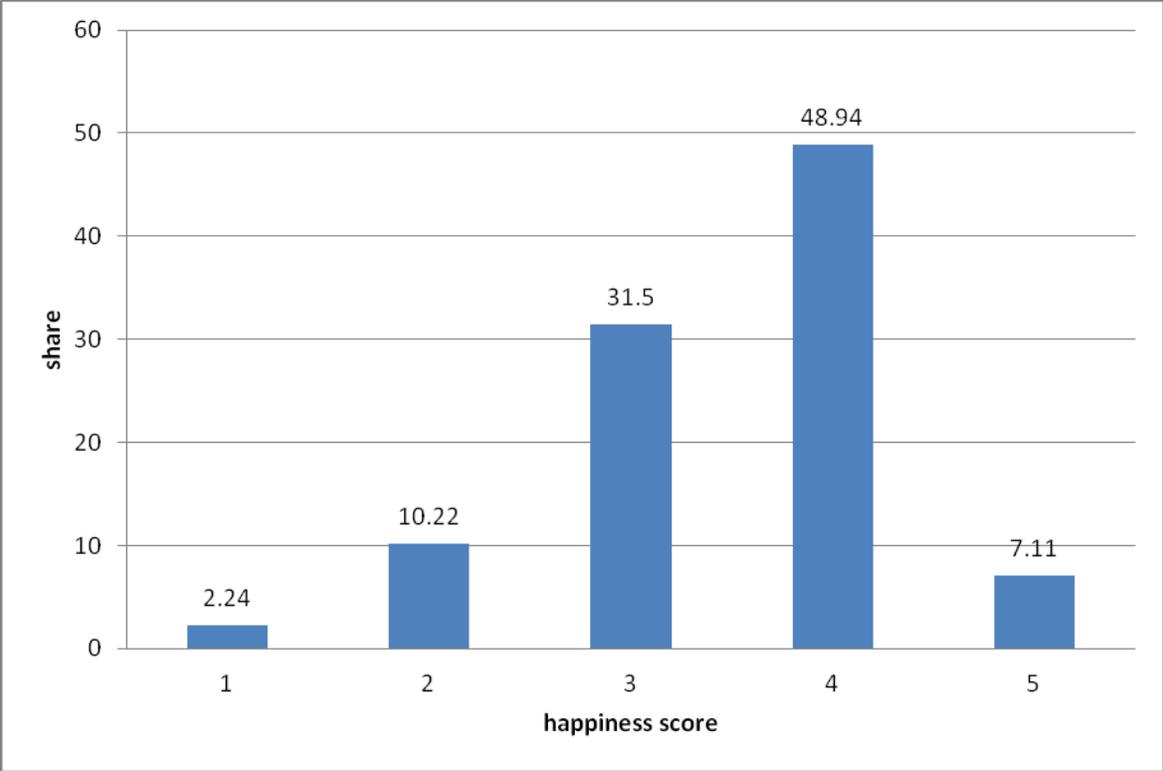
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**Figure 1: Distribution of reported happiness scores**



**Table 1: Summary statistics of the sample**

Variable	Mean	Std deviation	No. of Observation
Happiness	3.485	0.855	6753
Log(hhincome)	8.808	0.595	6817
Log(hhconsumption)	8.558	0.593	6818
Male	0.454	0.498	6818
Age	46.624	11.299	6818
Wai_di	0.008	0.089	6818
Minority	0.037	0.189	6816
Junior high	0.284	0.451	6805
High school	0.392	0.488	6806
Some college	0.184	0.388	6809
College	0.079	0.27	6804
Married	0.936	0.245	6816
Divorced	0.016	0.125	6816
Widowed	0.028	0.164	6816
Not_labor_force	0.016	0.127	6808
Retired	0.255	0.436	6808
Unemployed	0.026	0.159	6808
Xia_gang	0.029	0.168	6808
Disabled	0.001	0.024	6808
Hours	1.259	0.981	6818
Illness	0.072	0.259	6815
Health_help	0.016	0.124	6816
Log(net assets)	11.186	1.766	6818
Log(net debts)	0.119	1.077	6818
Log(net housing debts)	0.062	0.8	6818
Log(net business debts)	0.023	0.473	6818
Other_not_labor_force	0.667	0.627	6808
Other_retired	0.282	0.493	6808
Other_unemployed	0.095	0.314	6808
Other_xia_gang	0.042	0.206	6808
Other_disabled	0.013	0.116	6808
Other_illness	0.112	0.383	6815
Other_health_help	0.04	0.201	6816
Sd_log(hhincome)	0.217	0.289	6818
Log(pop)	1.071	0.265	6818
Child	0.42	0.494	6818
Second quartile	0.558	0.497	6802
Above median	0.331	0.471	6802
Large increase	0.023	0.151	6802
Small increase	0.462	0.499	6802
Decrease	0.192	0.394	6802
Log(avghhincome)	8.875	0.253	62
Log(avghhconsumption)	8.601	0.275	62
City_ji_guan (government)	0.103	0.065	62
City_qi_ye (enterprise)	0.570	0.125	62
City_shi_ye (institution)	0.237	0.083	62
City_guo_you (state-owned)	0.482	0.164	62
City_he_zi (joint venture)	0.025	0.035	62
City_cheng_zhen_ji_ti (collectively-owned)	0.111	0.079	62
City_cheng_zhen_ge_ti (individually-owned)	0.226	0.152	62
City_gu_fen (shareholding)	0.119	0.095	62
City_log(rent)	0.120	0.445	62
City_sd_log(hhincome)	0.534	0.135	62

The definitions of these variables are in the appendix

**Table 2: Effects of household income and income comparison on happiness**

Variables	(1)	(2) IV	(3)	(4) IV	(5)
Log(hhincome)	0.338*** (0.031)	0.743*** (0.216)	0.154*** (0.027)	0.399** (0.198)	
Log(avghhincome)	-0.295*** (0.084)	-0.595*** (0.177)			
Second quarter†			0.550*** (0.041)	0.485*** (0.066)	
Above median†			0.883*** (0.044)	0.767*** (0.102)	
Log(hhconsumption)					0.215*** (0.023)
Log(avghhconsumption)					-0.234*** (0.078)
<u>Individual-specific characteristics</u>					
Male	-0.066*** (0.022)	-0.032 (0.029)	-0.048** (0.021)	-0.032 (0.025)	-0.076*** (0.022)
Age	-0.043*** (0.007)	-0.045*** (0.007)	-0.037*** (0.007)	-0.039*** (0.007)	-0.042*** (0.007)
Age <sup>2</sup>	0.047*** (0.007)	0.047*** (0.007)	0.040*** (0.007)	0.041*** (0.007)	0.048*** (0.007)
Wai_di	-0.010 (0.109)	-0.013 (0.110)	-0.015 (0.105)	-0.017 (0.105)	0.023 (0.112)
Minority	0.093 (0.059)	0.078 (0.060)	0.041 (0.059)	0.030 (0.059)	0.099* (0.059)
Junior high	0.004 (0.047)	-0.043 (0.051)	0.010 (0.045)	-0.017 (0.049)	0.026 (0.048)
High school	-0.023 (0.047)	-0.130* (0.069)	-0.018 (0.045)	-0.077 (0.064)	0.024 (0.048)
Some college	-0.033 (0.052)	-0.207** (0.100)	-0.028 (0.050)	-0.125 (0.090)	0.036 (0.052)
College	0.026 (0.056)	-0.215 (0.134)	0.015 (0.054)	-0.116 (0.117)	0.126** (0.056)
Married	0.063 (0.081)	0.050 (0.084)	0.065 (0.079)	0.058 (0.080)	0.066 (0.082)
Divorced	-0.257** (0.127)	-0.186 (0.136)	-0.266** (0.124)	-0.226* (0.129)	-0.284** (0.127)
Widow	-0.156 (0.108)	-0.116 (0.114)	-0.159 (0.106)	-0.137 (0.108)	-0.180* (0.109)
Not_labor_force	-0.116 (0.098)	0.030 (0.112)	-0.085 (0.094)	-0.008 (0.106)	-0.178* (0.098)
Retired	-0.050 (0.054)	-0.013 (0.060)	-0.024 (0.052)	-0.007 (0.055)	-0.063 (0.054)
Unemployed	-0.394*** (0.091)	-0.200 (0.140)	-0.272*** (0.086)	-0.182 (0.113)	-0.476*** (0.090)
Xia_gang	-0.255*** (0.083)	-0.090 (0.123)	-0.201** (0.079)	-0.121 (0.102)	-0.331*** (0.083)
Disabled	-1.109*** (0.392)	-0.870** (0.391)	-0.645* (0.335)	-0.575* (0.332)	-1.208*** (0.409)
Hours	-0.028 (0.024)	-0.008 (0.027)	-0.016 (0.023)	-0.008 (0.024)	-0.033 (0.024)
Illness	-0.085* (0.045)	-0.079* (0.046)	-0.079* (0.043)	-0.078* (0.043)	-0.104** (0.046)
Health_help	-0.233** (0.095)	-0.193* (0.101)	-0.170* (0.095)	-0.156 (0.097)	-0.273*** (0.096)

<u>Household-specific characteristics</u>					
Log(net assets)	0.066*** (0.011)	0.027 (0.023)	0.036*** (0.010)	0.018 (0.017)	0.081*** (0.011)
Log(net debts)	-0.014 (0.022)	-0.051* (0.029)	-0.037* (0.021)	-0.056** (0.026)	-0.004 (0.023)
Log(net housing debts)	0.052** (0.021)	0.042* (0.023)	0.050** (0.020)	0.046** (0.021)	0.059*** (0.021)
Log(net business debts)	0.038 (0.032)	0.036 (0.033)	0.039 (0.032)	0.039 (0.032)	0.042 (0.032)
Other_not_labor_force	-0.010 (0.023)	0.067 (0.045)	0.009 (0.022)	0.049 (0.038)	-0.057** (0.022)
Other_retired	-0.026 (0.024)	-0.029 (0.025)	-0.025 (0.023)	-0.028 (0.024)	-0.021 (0.024)
Other_unemployed	-0.074** (0.036)	0.033 (0.063)	-0.035 (0.034)	0.019 (0.053)	-0.124*** (0.036)
Other_xia_gang	-0.132** (0.055)	-0.021 (0.081)	-0.109** (0.052)	-0.054 (0.069)	-0.178*** (0.055)
Other_disabled	-0.152 (0.096)	-0.058 (0.112)	-0.108 (0.097)	-0.064 (0.104)	-0.191** (0.095)
Other_illness	-0.056* (0.030)	-0.062** (0.031)	-0.051* (0.029)	-0.055* (0.029)	-0.056* (0.030)
Other_health_help	-0.235*** (0.059)	-0.229*** (0.060)	-0.170*** (0.058)	-0.174*** (0.058)	-0.232*** (0.060)
Sd_log(hhincome)	-0.071* (0.042)	-0.093** (0.042)	-0.047 (0.040)	-0.061 (0.040)	-0.074* (0.043)
Log(pop)	0.174*** (0.053)	0.308*** (0.091)	0.047 (0.051)	0.136 (0.089)	0.154*** (0.053)
Num. of Children	0.007 (0.028)	0.018 (0.030)	-0.008 (0.027)	0.000 (0.028)	0.006 (0.029)
<u>City-specific characteristics</u>					
City_ji_guan (government)	0.270 (0.321)	0.156 (0.331)			0.305 (0.346)
City_qi_ye (enterprise)	1.313*** (0.250)	1.180*** (0.262)			1.387*** (0.257)
City_shi_ye (institution)	1.492*** (0.297)	1.384*** (0.308)			1.546*** (0.304)
City_guo_you (state-owned)	-0.049 (0.324)	-0.070 (0.329)			-0.055 (0.327)
City_he_zi (joint venture)	0.270 (0.503)	0.305 (0.516)			0.258 (0.510)
City_cheng_zhen_ji_ti (collectively-owned)	0.191 (0.320)	0.143 (0.327)			0.206 (0.324)
City_cheng_zhen_ge_ti (individually-owned)	0.140 (0.332)	0.045 (0.340)			0.147 (0.337)
City_gu_fen (shareholding)	-0.183 (0.337)	-0.188 (0.342)			-0.213 (0.343)
City_log(rent)	-0.011 (0.038)	-0.010 (0.039)			-0.011 (0.038)
City_sd_log(hhincome)	-0.116 (0.126)	-0.010 (0.144)			-0.202* (0.121)
Province fixed effects	Yes	Yes	No	No	Yes
City fixed effects	No	No	Yes	Yes	No
R <sup>2</sup>	0.131	0.101	0.194	0.207	0.116
Sample size	6731	6731	6716	6716	6732

Notes: Robust standard errors in parentheses. In columns with the label IV, household income is treated as an endogenous variable. \* significant at the 10%, \*\* significant at the 5%, \*\*\* significant at the 1%.

**Table 3: Effects of expected future income on happiness**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	OLS	IV	OLS	OLS	OLS	OLS	OLS
Log(hhincome)	0.297*** (0.030)	0.291*** (0.030)	0.580*** (0.192)	0.534*** (0.063)	0.308*** (0.034)	0.306*** (0.034)		
Log(avghhincome)	-0.243*** (0.083)							
Log(avghhconsumption)							0.189*** (0.023)	0.189*** (0.020)
<u>Expected future income</u> <sup>†</sup>								
Large increase	0.437*** (0.067)	0.416*** (0.068)	0.382*** (0.071)	0.385*** (0.060)	0.333*** (0.062)	0.330*** (0.059)	0.426*** (0.069)	0.350*** (0.062)
Small increase	0.143*** (0.021)	0.151*** (0.021)	0.138*** (0.023)	0.141*** (0.025)	0.120*** (0.024)	0.121*** (0.024)	0.163*** (0.022)	0.134*** (0.024)
Decrease	-0.344*** (0.030)	-0.344*** (0.030)	-0.332*** (0.031)	-0.319*** (0.033)	-0.299*** (0.033)	-0.302*** (0.033)	-0.351*** (0.030)	-0.308*** (0.033)
<u>Personality trait</u>								
Trait 1				0.180*** (0.021)				
Trait 2					0.339*** (0.021)	0.338*** (0.021)		0.331*** (0.022)
Past income growth						0.004 (0.026)		0.042 (0.025)
Province fixed effects	Yes	No						
City fixed effects	No	Yes						
R <sup>2</sup>	0.177	0.172	0.179	0.196	0.220	0.221	0.161	0.208
Sample size	6715	6715	6715	6700	6700	6683	6716	6700

Notes: Robust standard errors in parentheses. † The benchmark consists of people who expect no change in their household income. Individual, household, and city characteristics are included in column 1 and only individual and household characteristics are included in the city fixed-effects models of columns 2 through 10. In column with the label IV, household income is treated as an endogenous variable.

\* significant at the 10%, \*\* significant at the 5%, \*\*\* significant at the 1%.

Table 4: **Effects of expected future income on happiness: IV estimates**

	(1)	(2)	(3)	(4) †	(5)
Log(hhincome)	0.171*** (0.047)	0.189*** (0.053)	0.188*** (0.056)	0.165*** (0.054)	
Log(hhconsumption)					0.133*** (0.032)
Expected future income	0.974*** (0.181)	0.869*** (0.233)	0.839*** (0.295)	0.851*** (0.270)	0.967*** (0.214)
Own temp contract			-0.019 (0.074)		
Own loss making			-0.054 (0.046)		
City fixed effect	Yes	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.219	0.215	0.219	0.218	0.201
Observations	6683	6683	6683	5227	6683

Estimates for the IVs in the first-stage regression

Other temp contract	-0.075*** (0.027)	-0.088*** (0.026)	-0.075*** (0.027)	-0.118*** (0.032)	-0.101*** (0.026)
Other loss making	-0.116*** (0.041)	-0.154*** (0.040)	-0.116*** (0.041)	-0.113** (0.051)	-0.172 (0.039)
Own temp contract	-0.076** (0.033)				
Own loss making	-0.170*** (0.042)				

Endogeneity and Overidentification Restrictions Tests

HN ( $\chi^2$ -statistic)	29.02	12.64	7.11	9.30	20.64
( <i>p</i> -value)	(0.000)	(0.004)	(0.008)	(0.002)	(0.000)
OR ( $\chi^2$ -statistic)	1.86	0.91	0.68	0.01	0.86
( <i>p</i> -value)	(0.603)	(0.340)	(0.409)	(0.929)	(0.355)

Notes: Robust standard errors in parentheses. †Excluding respondents who are on non-permanent contract or employed in loss-making enterprises. All regression models include Trait2, individual and household characteristics as covariates. In all regressions, expected future income is treated as an endogenous variable and is instrumented with at least two instrumental variables. HN: Hausman's tests of endogeneity. OR: Overidentification restrictions tests.

\* significant at the 10%, \*\* significant at the 5%, \*\*\* significant at the 1%.

**Table 5: Effects of expected future income changes on happiness: estimates by age group and household wealth**

	(1)	(2)	(3)	(4)
<b>Panel A: Young vs. Old</b>	Age $\leq$ 40	Age $\geq$ 50	Age $\leq$ 40	Age $\geq$ 50
Large increase	0.399*** (0.088)	0.138 (0.151)	0.416*** (0.091)	0.161 (0.152)
Small increase	0.177*** (0.050)	0.079* (0.043)	0.193*** (0.050)	0.088** (0.044)
Decrease	-0.353*** (0.077)	-0.291*** (0.059)	-0.366*** (0.078)	-0.294*** (0.059)
Log(hhincome)	0.316*** (0.048)	0.181*** (0.058)		
Log(hhconsumption)			0.190*** (0.041)	0.122** (0.046)
City fixed effects	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.218	0.233	0.207	0.228
Sample size	1925	1587	1925	1587
<b>Panel B: Rich vs. Poor (by household wealth)</b>	Bottom one-third	Top one-third	Bottom one-third	Top one-third
Large increase	0.481*** (0.139)	0.240** (0.094)	0.474*** (0.150)	0.266*** (0.099)
Small increase	0.138*** (0.049)	0.081** (0.035)	0.149*** (0.049)	0.095*** (0.036)
Decrease	-0.337*** (0.061)	-0.280*** (0.051)	-0.345*** (0.062)	-0.282*** (0.054)
Log(hhincome)	0.315*** (0.075)	0.286*** (0.033)		
Log(hhconsumption)			0.256*** (0.051)	0.126*** (0.033)
City fixed effects	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.228	0.166	0.221	0.151
Sample size	2304	2296	2304	2296

Notes: Robust standard errors in parentheses. All regression models include Trait2, individual and household characteristics as covariates.  
\* significant at the 10% level, \*\* significant at the 5% level, \*\*\* significant at the 1% level.

**Table 6: Effects of expected future income changes on happiness: IV estimates by age group and household wealth**

	(1)	(2)	(3)	(4)
	Age≤40	Age≥50	Age≤40	Age≥50
<b>Panel A: Young vs. Old</b>				
Expected future income	0.704** (0.295)	1.343 (1.067)	0.833*** (0.264)	1.276 (0.857)
Log(hhincome)	0.220*** (0.084)	0.078 (0.123)		
Log(hhconsumption)			0.148*** (0.053)	0.172** (0.076)
City fixed effects	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.235	0.265	0.222	0.259
Sample size	1925	1587	1925	1587
<b>Panel B: Rich vs. Poor (by household wealth)</b>				
	Bottom one-third	Top one-third	Bottom one-third	Top one-third
Expected future income	0.856** (0.335)	0.168 (0.217)	0.940*** (0.314)	0.331* (0.201)
Log(hhincome)	0.199** (0.091)	0.283*** (0.050)		
Log(hhconsumption)			0.170*** (0.061)	0.123*** (0.034)
City fixed effects	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.240	0.182	0.231	0.166
Sample size	2304	2296	2304	2296

Notes: Robust standard errors in parentheses. All regression models include Trait2, individual and household characteristics as covariates. In all regressions, expected future income is treated as an endogenous variable and the instruments used are employment contract and firm profitability pertaining to the respondent's other family members.

\* significant at the 10% level, \*\* significant at the 5% level, \*\*\* significant at the 1% level.

## Appendix

Table A-1: Definition of variables used

Variable name	Definition
Happiness	The answer to the question: ‘generally speaking, do you feel happy?’ where 1 denotes “not happy at all”, 2 “not very happy”, 3 “so-so”, 4 “happy” and 5 “very happy”.
Log(hhincome)	Log household income per capita in 2002. Household income includes monetary and nonmonetary after tax and social security payment income in 2002, which is constructed using individual annual income aggregated from monthly income data and household total nonmonetary (in kind and service) income.
Log(hhconsumption)	Log household consumption per capita, which include expenditures on food, clothes, home equipment, facilities and services, health and medical services, transportation and communication, entertainment, education and culture services, housing, and other miscellaneous goods and services.
Wai_di	Dummy variable for those who do not have local Hukou, which refers to the system of residency permits in China that identifies a person as a resident of an area.
Minority	Dummy variable for those who are not of Han Chinese ethnic group
Junior high, high school, some college, and college	Dummy variables for educational level. Primary school or no school is the omitted category.
Married, divorced, and widowed	Dummy variables for marital status. Never married is the omitted category.
Not_labor_force	Dummy variable for full-time student, homemaker, or other (not in the labor force)
Retired	Dummy variable for those who are retired (including early retirement, internal retirement or li-xiu --officially off-duty)
Unemployed	Dummy variable for those being unemployed (including those who are waiting for government job assignment or continuous education.)
Xia_gang	Dummy variable for those being laid off (xia_gang) or on leave (li_gang)
Disabled	Dummy variable for those who are unable to work due to disabilities
Employed (omitted category)	Dummy variable for those who are employed
Hours	Hours worked per month for those who were employed by the end of 2002 (unit: hundred hours), and 0 for those who were not employed.
Illness	Dummy variable indicating the respondent suffered a serious illness in 2002
Health_help	Dummy variable for those who has one or more of the 8 listed chronic disease or disabilities and whose conditions are serious or need help. The eight listed chronic disease or disabilities include limb disabilities or hemiplegia; visual disabilities; hearing and speaking disabilities; psychopathic diseases; retarded; frail; chronic diseases; and other disabilities.
Log(net assets)	Log household (positive) net worth, and 0 if the net worth is negative. Household assets include financial assets, durable goods, productive fixed assets, houses, and other assets. Household debts include bank loans and other borrowings.
Log(net debts)	Log of the absolute value of household net worth if it is negative, and 0 if the net worth is positive.
Log(net housing debts)	Interaction of log(net debts) and a dummy variable indicating that the household has bank loads or other borrowings for building or purchasing houses
Log(net business debts)	Interaction of log(net debts) and a dummy variable indicating that the household has bank loads or other borrowings for business
Other_not_labor_force	Number of other household members that have the corresponding characteristics as defined above.
Other_retired	
Other_unemployed	
Other_xia_gang	
Other_disabled	
Other_illness	
Other_health_help	
Sd_log(hhincome)	Standard deviation of log household per capita income from 1998 to 2002.
Log(pop)	Log total number of people living in the household

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Child Second quartile, and above median	Dummy variable indicating having children under age 16 in the household  Dummy variables constructed according to the perceived position of living standard in the city. The survey question is: In which group do you think your household living standard falls in the city in 2002? The answers are: in the lowest 25%; in the next lowest 25%; in the third lowest 25%; and in the highest 25%. The dummy variable 'second quartile' indicates the next lowest 25%, and the 'above median' indicates the highest 25% or the third lowest 25%. The 'first quartile' is the omitted category.
Large increase, small increase, and decrease	Dummy variables constructed according to the answer to question: How do you think of your household income in the next 5 years? The answers are: large increase; small increase; no change; decrease. No change is the omitted category.
Log(avghhincome)	Log city sample average household income per capita in 2002. Household income per capita is defined as above. The two province-level municipalities, Beijing and Chongqing, are treated as cities.
Log(avghhconsumption)	Log city sample average household consumption per capita in 2002. Household consumption per capital is defined as above.
City_ji_guan (government)	The government share of city total employment in the sample.
City_qi_ye (enterprise)	The share of employment in enterprises in the city.
City_shi_ye (institution)	The share of employment in institutions in the city.
City_guo_you (state-owned)	The share of state owned enterprises in the city
City_he_zi (joint venture)	The share of Sino-foreign joint venture or foreign owned enterprises in the city
City_cheng_zhen_ji_ti (collectively-owned)	The share of collectively owned enterprises in the city
City_cheng_zhen_ge_ti (individually-owned)	The share of private owned enterprises in the city
City_gu_fen (shareholding)	The share of joint stock enterprises in the city
City_log(rent)	City average log housing price (RMB) in the sample. Housing price is defined as monthly rent or estimated monthly rent for private owned house per square meters of the construction area of the house.
City_sd_log(hhincome)	City standard deviation of log household income per capita in 2002

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