Satisfaction with Life and Income: Evidence from Urban China

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– Preliminary draft, comments welcome –

Abstract

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1 Introduction

A central motivation for economic development is that higher per-capita income increases welfare. The intuition behind this motivation is straightforward: Higher income loosens an important constraint on economic choices: it enables individuals to make, e.g., consumption and investment choices that yield higher utility than at a lower income. Indeed, research has shown that in a cross-section, individuals with higher income report higher satisfaction with life (for a review, see Frey and Stutzer [2002]). However, longitudinal evidence also suggests that increasing a society's income does not nearly lead to as high an increase in life satisfaction (see, e.g., [Easterlin, 2001]).

A possible explanation for this difference is that utility not only depends on one's own consumption, but also on the consumption of a reference group [Frank, 1985]. Various psychological mechanisms suggest that higher consumption of the reference group decrease utility. It is plausible, e.g., that consumption of close friends serves as a reference level against which an individual judges her own consumption [Tversky and Griffin, 1991]. Several studies find that if an individual's income is higher than the average income of individuals with similar demographics, satisfaction with life is higher. The studies also find that satisfaction is lower, the higher the reference group's consumption. Assuming that individuals with similar demographics are the relevant reference group in social contacts, this evidence can be interpreted that utility is influenced by the income of one's reference group. (See Clark and Oswald [1998], Kapteyn et al. [1985], McBride [2001], and Blanchflower and Oswald [2004], for evidence from the U.S.)[1] This paper is closest in spirit to Luttmer [2005]. Luttmer uses data from the U.S. and shows that individuals living in a neighborhood with higher income report lower satisfaction with life, ceteris paribus. These studies paint a bleak picture regarding the gains in life satisfaction from economic development: The estimates in most of the studies (see, e.g., Luttmer [2005] or Stutzer [2004]) imply that the net gain in life satisfaction from an increase in per-capita income is almost zero, because the income increase also raises the reference incomes.

In contrast to these earlier studies, we present evidence from a transition economy. Transition economies are particularly interesting in this context, as these are the economies to experience the greatest gains in welfare from economic growth. As the marginal propensity to consume may be relatively high, increases in income are likely to have a larger impact on satisfaction with life. At the same time, this may also make the individuals more susceptible to changes in their reference group's consumption. Therefore, the externality caused by the consumption of others could be particularly strong in transition economies. We use a survey conducted among

[1] For studies using a slightly different methodology, see van Herwaarden et al. [1977] and Stutzer [2004]

shoppers in three cities in the People's Republic of China: Nanchang, Shenzhen, and Shanghai. The survey primarily targeted young shoppers between the age of 20 and 40 in or near shopping malls in these three cities. Thus, our sample consists of relatively well-to-do individuals, but yet, there is strong variation in income among them. We follow the literature and use life satisfaction as my measure of utility. We find a strong cross-sectional correlation of the income with life satisfaction, controlling for a large set of demographics. The impact is considerably larger than in most other studies so far: Doubling the income increases the fraction of individuals reporting being satisfied with life from 45% to 80%.

It is important to ask how much of this increase really stems from the increase in income itself, and how much of it is due to the fact that higher income may also be associated with higher relative income. Our survey uses a new measure of relative income: we directly ask respondents whether they earn more or less than their closest friends. This direct measure has several advantages over the previous measures. First, previous studies use proxies for perceptions of whether others in the individual's reference group earn more or less. We measure these perceptions directly by asking individuals about them. Second, the turbulent economic transition in China, coupled with research on friendship formation, create credibly random variation in the respondents' friends' incomes.

We test the central hypothesis of a model in which a reference group's consumption enters the utility function: the central prediction is that utility should be lower when the individual earns less than her closest friends, and should be higher when the individual ears more than her closest friends, holding income constant. We find strong support for this hypothesis. There is a statistically significant negative effect of one's friends' income on satisfaction with life: Richer friends reduce satisfaction with life considerably. The effect is quantitatively large: The loss in life satisfaction when one's friends earn more rather than less than oneself are equivalent to the loss in life satisfaction with moving from the top income bracket to the bottom income bracket in my sample. The loss in satisfaction when one earns less than her/his friends is much greater than the gain in happiness from earning more. This strongly suggests that individuals' preferences over relative income display loss aversion, a key ingredient of reference-dependent preferences Kahneman and Tversky [1991]. However, despite the large effect of relative income on satisfaction, we still find a very large and highly significant effect of income on happiness. This finding is in clear contrast to the results from developed (western) countries and strongly suggests that there is strong scope for economic development to increase satisfaction with life, in contrast to the conjecture in Kahneman and Krueger [2006].

The second hypothesis relates to the shape in which the friends' income enter the utility function: If the friends' income raise the marginal utility of one's own income, their income raises

spending, as assumed, e.g., in Becker et al. [2005]. We further examine how the respondents' desired income varies with relative income. Individuals with friends who earn more report higher levels of income needed to get by than individuals who earn the same as their friends, as assumed in, e.g. Becker et al. [2005]. Interestingly, there is no significant difference in the income needed to get by between people who earn more than their friends and people who earn the same, despite a large and significant utility difference between these two groups. These results suggest that the income of one's reference group affect the overall utility, but only change the marginal utility, and hence consumption allocations, for individuals who feel they are behind their friends.

The remainder of this paper is structured as follows: Section 2 lays out the empirical setup and discusses the empirical strategy. Section 3 presents the results. Section 4 concludes.

2 The Empirical Setup

2.1 Data

We collaborated with a firm to conduct the survey. The primary reason to conduct the survey was to assess the demand for diamonds among affluent young females. The survey was conducted on behalf of a jewelry importer in shopping areas in three cities (Nanchang, Shanghai, and Shenzen). We supplemented the survey with questions regarding income, life satisfaction, and income comparisons to the respondent's friends. The survey also included a set of demographic variables.

The survey was conducted in November and December 2004, targeting 1000 respondents in each city. Of the 3000 respondents beginning the survey, 736 did not complete it and are omitted from the data. Of the 2266 respondents who completed the survey, 352 refused to answer in at least one question and are also dropped from the sample.

2.2 Descriptive Statistics

Table 1 shows the basic demographic characteristics of the respondents. As required by the jewelry importer, the survey primarily approached women under the age of 40. Most of the respondents have completed secondary education, and 41% have a college or university degree. Table 3 provides the distribution of income. The categories displayed are the categories used in the survey. The table shows that only 24.45% earn less than 2,000 Yuan per month. The median is in the RMB 2,000 to 3,000 category. The imputed average income[2] is 3,379 RMB. This

[2]see Table 3 for details on the imputation.

indicates that our sample is considerably wealthier than average urban Chinese. For example, Burkholder [2005] reports an average monthly income of RMB 2,000. More than 75% of our sample earn more than this amount per month.

Table 2 provides the descriptive statistics for our measure of satisfaction with life. We use a four-point scale, with two categories to express dissatisfaction, and two to express satisfaction. The question read "Overall, how satisfied are you with your life?". A substantial number of respondents (40%) report being somewhat or very dissatisfied with life. Table 2 also contrasts the results with the responses of the urban sample in Burkholder [2005]. It shows a very similar pattern: In Brukholder's study and ours, close to 40% report being somewhat or dissatisfied with life. This fraction is higher than the fraction of dissatisfied individuals in western countries.[3] We will use a binary variable, indicating whether the individual responded she was satisfied or very satisfied as the key dependent variable in the estimation below.

Figure 1 shows the distribution of one of the key variables, the respondents' income relative to their closest friends. There were five categories to answer, two to indicate that the respondent's income was lower than their friends', two for higher income, and one was labeled "about the same" to capture identical or very similar incomes. As Figure 1 shows, the most frequent answer is that the friends have about the same income as the respondents. There is, however, a substantial fraction of individuals with lower incomes than their friends (24 % of the sample), and with higher incomes (32% of the sample). The figure also shows that there is a clear tendency for richer individuals to also be richer than their friends. For example, while only about 10% in the bottom income category earn more than their friends, about 60% of the top income category do so. Therefore, higher income is in this case also strongly correlated with higher relative income.

Table 3 also shows the distribution of the response to the following question: "In your position, what is the monthly income you need to life well?" We will use the answer to this question to examine whether differences in income to one's friends lead to higher desired spending. It would have been preferable to use actual consumption data, but time constraints in the survey did not allow us to collect consumption data in sufficient detail to test our hypothesis. Thus, while the question is somewhat unusual, it has a clear an intuitive interpretation: The higher the amount stated, the higher the (desired) consumption level of a respondent. A notable feature is that the needed income is substantially higher than the income the individuals have. For example, about 50 % of the respondents state they need an income of RMB 4,000 or more, yet only about 25% answer that they earn RMB 4,000 or more. The imputed mean of the desired

[3] See Frey and Stutzer [2002]. Though it is difficult to compare ordinal measures across studies, most studies in western countries find far fewer individuals expressing dissatisfaction with life. The typical fraction of individuals in the categories associated with at least some dissatisfaction ranges between 10 to 20% in western countries.

income is also clearly higher than the mean of income. It is again obvious from the orders of magnitude in response to this question that the respondents are quite affluent and have very high aspirations: The imputed mean is nearly twice the income of urban chinese in Burkholder [2005].

2.3 Empirical Strategy

The basic strategy is to estimate regressions of the form

$$sat_i = \gamma \mathbf{rel}_i + \delta \mathbf{inc}_i + b\mathbf{x}_i + e_i \tag{1}$$

where sat_i is a binary variable equal to one if the individual responded that she/he was somewhat satisfied or satisfied with her/his life. The vector $\mathbf{rel}_i$ is a vector of binary variables, indicating whether individual i earns somewhat less, a lot less, somewhat more, or a lot more than her/his closest friends. We leave out earning about the same as one's friends as the reference category. Similarly, $\mathbf{inc}_i$ is a vector of binary variables, indicating the the income category of individual i. The omitted category in this case is the bottom income category. The vectors γ and δ are the associated estimated coefficient vectors. Finally, the vector $\mathbf{x}_i$ contains controls for education, age, gender, lifestyle, and marital status.

We estimate linear probability models and correct for the inherent heteroskedasticity by estimating Huber-White robust standard errors. None of our results depend on whether we estimate (1) as a linear probability model, a probit, or an ordered probit model (using the full ordinal scale of the answers).[4]

In contrast to earlier studies, we ask individuals directly about their perceptions of their income relative to their friends. The most common approach, first proposed by Clark and Oswald [1998] is to use the average income in an individual's education group as a proxy of the reference group's income. Luttmer [2005] takes the average income in an individual's census tract as the reference income. These approaches are indirect, because they rely on an ad-hoc construction of the reference income. While our approach gives us a direct measure of the income relative to a socially relevant reference group, it relies on the assumption that variations in incomes between friends are credibly random with respect to happiness. Research from psychology and economics is consistent with this view. Several studies show that randomly assigning a roommate increases the probability that the roommate becomes a friend relative to an individual with comparable characteristics by a factor of 2 or 3. This effect is even stronger for individuals

[4]Since our dependent variable has a mean of about 0.6, the differences between the coefficients in a linear probability model and the marginal effects from a probit or an ordered probit are expected to be small. See Moffit [1999] for a discussion.

with relatively similar characteristics, but it is important to stress that it is still very large for individuals with starkly different characteristics and cultural backgrounds [Marmaros and Sacerdote, 2006, Foster, 2005]. These mechanisms of friendship formation are easily consistent with the pattern in Figure 1: If similarity is an important factor in forming friendships, it is not surprising that in each income category, individuals are most likely to have friends with a similar income (if friendship formation were perfectly random, individuals in more sparsely populated income categories should more often frequently friends with different incomes). A study by psychologists in China showed that perceived openness, intellect, extroversion, and helpfulness were characteristics that were associated with stronger friendship among randomly assigned roommates in Chinese universities [Lee and Harris Bond, 1998, Tam and Harris Bond, 2002]. In this study, even though the students differed strongly in their social background, there was no evidence that differences in these background variables mattered for friendship formation.

Therefore, the evidence we cited above suggests that the differences in income between friends, if they occur, can largely be considered as random, since random matching has been shown to be a powerful initiator of friendships. In particular, there is *no* evidence to suggest that individuals seek out richer friends systematically.

3 Results

3.1 Life Satisfaction

We first turn to the results for life satisfaction. Income plays an important role in determining satisfaction with life in our sample. The dashed line in Figure 2 shows average life satisfaction, measured by the fraction of individuals reporting being satisfied or very satisfied with life, in each income category. As can be seen in Figure 2, there is a strong and positive association between income and satisfaction with life: Only about 45% report being satisfied with life in the bottom income category, while 80 % report being satisfied with life in the two top income categories.

Column (1) in Table 4 is the corresponding regression to perform a formal statistical test. The results show that income is also statistically a highly significant determinant of life satisfaction. However, it could be that, e.g., better educated individuals enjoy life more and earn more, thus confounding the impact of income on happiness in column (1). In column (2), we include demographic controls for education, employment status, gender, age, life style, and city. The income profile is still highly significant, and becomes slightly steeper.

Thus, income plays an economically and statistically significant role in determining life satis-

faction. Remember, however, that Figure 1 showed that income and relative income were highly correlated. As a next step, we decompose this relationship into the effect of income, and the effect of income relative to one's friend. Figure 2 shows the income profile on life satisfaction for three groups: Individuals whose income is lower than their friends' (the blue line), about the same (the grey line), and higher (the green line). Comparing the blue to the gray line, we see a stable and large difference in life satisfaction between the two groups: Holding the income category constant, individuals who earn less than their friends are less satisfied with life. The impact is quantitatively large, and stable across the categories: the fraction reporting being satisfied with life is approximately 30 percentage points lower for those individuals earnings less than their friends. Figure 5 also reveals that individuals earning more than their friends report being more satisfied with life than those with same income as their friends. The impact is 10 percentage points, which still meaningful, but distinctly smaller than the negative effect of earning less than one's friends.

Columns (3) and (4) offer a formal statistical test of significance. In column (3), we add the relative income to the income profile alone, using all five possible responses to the relative income question (earning the same as friends is omitted). In column (4), we also control for demographics. The results show that the effect of relative income is highly significant and that it is robust to the inclusion of the demographic controls.

A possible concern with these results is that since we only use income categories, it is likely that individuals in the lower end of a category will earn less than their friends, while individuals near the top of a category will tend to earn more than their friends. Notice, however, that this can never explain the entire magnitude of the measured effect here: Column (2) shows that the largest increase in satisfaction from one income category to the next is 0.12. Thus, if relative income measures only differences in the location within an income category, this is the upper bound on such an effect. The estimated differential from earning less than one's friends to earning more than one's friends is $0.293 + 0.070 = 0.363$, three times larger an effect. Thus, inaccuracies due to categorical income data can account for at most one third of the difference in life satisfaction that we find.

Results from studies in western countries often imply that raising everybody's income does not raise happiness in the aggregate [Clark and Oswald, 1998, Stutzer, 2004, Luttmer, 2005]. That is, in western countries, income mainly increases utility because of the higher associated position in the income distribution. It is noteworthy that we do not find this result in our sample. The income profiles in columns (3) and (4) hold the relative income position constant. They show a significant and large gain in happiness from higher income.

Notice also in column (3) and (4) that earning somewhat less than one's friends reduces

happiness by distinctly more than earning somewhat more increases happiness. This is consistent with loss aversion around a reference outcome [Kahneman and Tversky, 1991]. Loss aversion posits that losses, i.e., falling short of a reference outcome hurts more than exceeding a reference outcome is pleasurable. Our results conform to this assumption. The table also shows that earning much less or just somewhat less than one's friend does not have a differential effect on happiness. This is consistent with what Kahneman and Tversky [1991] term diminishing sensitivity over losses: The marginal damage of a loss is greater the closer the individual is to the reference outcome (once the individual is far enough away from the reference outcome, it "doesn't matter anymore"). These two features suggest that a plausible and well-known mechanism – reference-dependent evaluations as in Kahneman and Tversky [1991] – is at work when individuals evaluate their income relative to their friends.

In column (5), we test whether the income profiles themselves are different depending on whether one earn more, the same or less than one's friends.[5] we display all three profiles next to one another. F-tests find no significant difference between the three profiles. Thus, higher income yields more happiness to the same degree, irrespective of the relative income. This is indicative that two separate and independent valuations are applied to the income level per se, and to the relative income. The valuation of income conforms to a standard utility function displaying decreasing marginal utility of income, i.e., decreasing marginal gains in happiness with increasing income. The valuation of the relative income displays all the features of reference-dependent preferences.

In summary, these results point towards a strong externality of one's friends' income: Earning less rather than the same as one's friends reduces life satisfaction by a large amount. Earning more rather than the same as one's friend increases satisfaction, though not nearly as much as being behind causes dissatisfaction – consistent with reference-dependent preferences. However, holding the relative income constant, higher income is clearly associated with higher satisfaction with life. Thus, while we find concerns for relative income that are just as large as those found in western countries, we also find in our sample of urban chinese that, holding relative income constant, higher income is clearly associated with more happiness.

3.2 Desired Income as a Measure of Consumption

A next step in the analysis is to examine whether relative income, in addition to affecting life satisfaction, also has an impact on consumer choices. The cleanest possible test of this hypothesis would be to examine how relative income affects consumption directly. Do individuals with richer

[5]For the interactions, we condense relative income to three categories (earn more, earn the same, or earn less). However, we maintain all five categories for the main relative income effects.

friends consume more in order to keep up with them? As discussed in the previous section, we use the answer to the following question: "what monthly household income do you need in your position to live well?" While we cannot measure consumption directly, we take a higher answer to this question to indicative of a higher desired level of consumption. Thus, we test whether earning less than one's friends leads individuals to indicate a higher desired income, holding their income constant.

Figure 3 shows the income profile to the response separately for the three groups with more, the same or less income than their friends. The profile is upward-sloping, but with a slope of less than one. That is, for increasing income by, say, 1000 Yuan increases the desired income level by less than 1000 Yuan. At higher income categories, the profile tends to flatten out. This is consonant with a concave consumption function [Carroll, 2001], suggesting that the question is a useful proxy for consumption. The figure reveals a strong impact of the relative income on desired spending. Compared to individuals who earn as much as their friends, individuals earning less than their friends state a higher amount needed to live well. There is no discernible impact of earning more than one's friends in Figure 3.

To examine this in more detail, Table 5 reports the results from the parallel regressions with the same structure as in equation (1). The dependent variable in this case is the income category the individual indicated.[6] The structure of the table follows Table 4. It confirms the visual impression from the figure. Desired income increases with income, but less than one-for-one, as suggested by the figure. We test this by examining whether desired income increases at least by the differences in mid-points of the income categories. As can be seen in Table 5, this is clearly rejected.

Turning to the impact of relative income, we find that if a respondent earns less than her/his friends, then she/he indicates a higher desired income. The effect is large in magnitude and highly statistically significant. As can be seen, the effect scales with how much the individual is behind: Individual earning just somewhat less than their friends state that they'd need another RMB 670 to live well (Table 5, column (3)). Individuals earning a lot less than their friends state that they need an extra RMB 1,428 per month. The table also shows that, if anything, higher income than one's friends is associated with higher desired income. All the point estimates are small in relative size, and only one in (column (4)) is statistically significant.

It is important to remember that there is the possibility that our measure of relative income may also be correlated with income within an income category, as discussed in section 3.1. Notice that with the upward-sloping income profile, this leads to an downward bias in the estimated coefficients on lower relative income, and to an upward bias on the coefficients on higher relative

[6] Identical results are obtained using interval regressions. See our non-existent appendix.

income. This is important for two reasons: First, despite this downward bias, we still find an effect of lower relative income on desired income. Second, it may explain the small positive coefficient on the high-relative-income coefficient.

Overall, we conclude that the pattern found in desired consumption also conforms well to the two motivations (diminishing marginal utility of consumption / reference-dependent evaluation of relative income) discussed in section 3.1.

3.3 Intensity of Socializing

We have shown that people's income relative to their friends' is important for their life satisfaction and possibly for their consumption choices. Given these findings, it seems reasonable that the salience of relative income may partially determine the strength of its effect on happiness. Although many personal characteristics and aspects of social interactions may help determine the variation in this salience, one measurable contributing factor is people's frequencies of interaction with their income reference groups.

To test this factor's importance to the relative income effect, we interact the frequency with which people socialize with their friends with relative income (Table 6, columns 1 and 2). Specifically, we set the variable soc_i equal to one if individual i socializes often with her friends (more than twice per month) and equal to zero otherwise. We create the opposite dummy variable (which represents infrequent socializing)and estimate the following augmented version of equation (1):

$$sat_i = \gamma_1 \mathbf{rel}_i soc_i + \gamma_2 \mathbf{rel}_i (1 - soc_i) + \delta \mathbf{inc}_i + b_1 soc_i + b_2 \mathbf{x}_i + e_i. \quad (2)$$

That is, we estimate a separate coefficient vector for the impact of relative income on happiness depending on whether individual i has a lot of social contact or little social contact. We repeat this exercise for three different categories of individuals we asked the individuals about the frequency of socializing: Close friends, family, and business associates.

Perhaps the most reasonable hypothesis for these tests is that more frequent socializing will increase the salience of relative income and therefore strengthen its effect on happiness. More concretely, if two individuals earn less than their friends, then the one who socializes with his friends more frequently should be more unhappy, all else equal, due to his increased awareness of his friends' incomes. Luttmer [2005] measures the frequency of socializing with neighbors and finds support for this hypothesis.

However, our results are generally not consistent with this hypothesis. First, when people make less than their friends, there is no significant difference between the coefficients for so-

cializing frequently and infrequently for any type of social contact (friends, family, or business associates). This result may not be too surprising, however, since the effect on satisfaction of earning even a little bit less than one's friends is so strong (see Table 4); that is, the salience of making less than one's friends seems to be quite powerful, no matter how often one interacts with one's reference group. Second, when people earn more than their friends, socializing more with friends or family *weakens* the effect of relative income on their happiness. Individually, these effects are significant at the 5-percent level or lower, regardless of whether demographics are included in the regressions. Finally, although socializing more with business associates does strengthen the effect of relative income slightly for high relative earners, this result is only marginally significant.

Thus, these results hint that the impact of relative income on happiness may depend on the type of socializing: Socializing often with ones family and friends seem to weaken the loss in happiness due to lower relative income, while socializing often with business associates seem to exacerbate it. To explicitly test whether the results for business associates are different from the results for friends and family, we run two more regressions in Table 5. In column 1, we include the interactions between relative income and socializing often with business associates and other types of friends:

$$\begin{aligned} sat_i = \gamma_0 \mathbf{rel}_i + \gamma_1 \mathbf{rel}_i family_i + \gamma_2 \mathbf{rel}_i business_i \\ + \delta \mathbf{inc}_i + b_1 family_i + b_2 business + b_3 \mathbf{x}_i + e_i. \end{aligned} \tag{3}$$

where $family_i$ is a dummy variable if the individual socializes more than twice a month with his family, and similarly, *business* is a dummy variable indicating that the individual socializes more than twice a month with business associates. Thus, γ_1 and γ_2 are interaction effects, indicating how socializing often with the respective group changes the impact of relative income on happiness. It also allows us to formally test whether $\gamma_1 = \gamma_2$. We also repeat the same exercise replacing $family$ with an indicator for whether one socializes often with one's friends. As can be seen in Table 7, we find that the interactions are indeed significantly different from each other($p = 0.025$ for the difference between socializing often with business associates and friends, and $p = 0.001$ for the difference between business associates and family).

With regard to the first unexpected result, we can tentatively theorize that the differences among the results for the various socializing variables in our sample, as well as between Luttmer's findings and ours, are due to differences in the types of social contacts made with different subgroups of people's income reference groups. For example, compared to social settings common for meeting friends, it may be that socializing with business associates (or with neighbors) entails spending time in a more comparison-rich setting, such as a rival office or an expensive

restaurant.[7] Alternatively, if people generally know their friends' and family's incomes without interacting with them, then the salience of friends' and relatives' incomes may not depend on the frequency of social contact as closely as the salience of business associates' or neighbors' incomes depends on social contact. Still, it is particularly surprising that spending more time with one's friends does not increase the strength of the relative income effect, given that this group exactly corresponds to the reference group for the relative income measure in our survey.

4 Conclusions

Do concerns for relative income mitigate welfare gains from increasing welfare? Evidence from developed, western countries strongly suggest only small gains in happiness with raising per-capita income [Clark and Oswald, 1998, Stutzer, 2004, Luttmer, 2005]. In this study, we use evidence from newly affluent individuals in a transition economy displaying fast, but unequal, growth rates in incomes. We find evidence that individuals care about two aspects of their income: They care about their income level, as assumed in any economic model: We find significant and large gains in happiness associated with higher income, holding the position in the income distribution constant. This is in stark contrast to the results obtained by the previous literature on western countries. A plausible interpretation is that the gains in happiness associated with higher income are much larger in transition economies. In line with this interpretation, we also find diminishing marginal gains in happiness as the income gets higher, consonant with concave utility from consumption.

However, we also find that individuals care about their relative income: We find that individuals earning more than their friends are happier, and individuals earning less than their friends are unhappier, holding income constant. These effects again, are quantitatively large. Further, we find that the way happiness is affected by relative income nicely corresponds to reference-dependent evaluations [Kahneman and Tversky, 1991]: Our results bear the clear sign of loss aversion: Having a somewhat lower income than one's friend leads to a reduction in happiness that is more than twice as large as earning somewhat more than one's friends increases happiness.

How does this evidence square up with the aggregate evidence regarding the wellbeing of Chinese over the last 10 year? The average per-capita income in urban China have almost tripled between 1994 and 2004, yet happiness seems, if anything, to have declined over the same time. However, several studies indicate that earnings inequality has also risen substantially over

[7] It is also quite possible that the differences specifically between our results and Luttmer's are due to cultural differences between the United States and China. These differences, although hard to quantify, are non-trivial and certainly have an impact on the nature of social interactions in each country.

the time, growth rates in per-capita incomes are highly volatile. Simple back-of-the-envelope calculations using our estimates suggest that even moderate variance in incomes between friends can wipe out the substantial average welfare gains from economic transition. On a more positive note, these results suggest that even tough much of the welfare gains may not be visible in transition times with high interpersonal variance in incomes, there may be a substantial rise in happiness one the dust from the turbulent transition settles.

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Table 1: Descriptive Statistics

Variable	Percent	Variable	Percent
Gender		**Head of Household's Employment Status**	
Male	24.2	Work at state-owned firm	17.1
Female	75.8	Work at private firm	48.3
		Work at foreign-owned firm	28.5
Age		Doesn't work	6.0
< 20	4.9		
20–25	31.3	**Socialize with Friends**	
26–30	34.6	<Once/month	6.7
31–35	17.7	Once/month	33.5
36–40	6.3	Twice/month	13.8
> 40	5.1	Once/week	15.1
		>Once/week	21.0
Marital Status		Don't know	10.1
Single	42.5		
Married	50.8	**Socialize with Family**	
Divorced	5.3	<Once/month	12.2
Widowed/Widower	1.4	Once/month	32.2
		Twice/month	17.6
Education		Once/week	13.0
Primary education	10.3	>Once/week	13.4
High school/Technical school degree	47.0	Don't know	11.6
College/University degree or higher	42.6		
		Socializes with Business Associates	
Lifestyle		<Once/month	14.6
Business		Once/month	16.9
male	33.9	Twice/month	15.5
female	24.7	Once/week	12.7
Financially independent		>Once/week	12.1
male	33.7	Don't know	28.3
female	41.6		
"Old money" or Leisurely			
male	35.9		
female	43.3		
Housewife/House-husband			
male	10.8		
female	21.7		

Notes: Only individuals that have non-missing values for all regressors in model (4) of Table 4 are included in these statistics. In general, the number of observations is equal to 1,914. However, due to additional missing responses, there are 1,542 responses for socializing with friends, 1,537 for socializing with family, and 1,491 for socializing with business associates. For lifestyle questions, more than one answer was allowed.

Table 2: Satisfaction with Life

	This Study ($N = 1,914$)	Gallup Poll (2004)
Not satisfied at all	7%	8%
Not so satisfied	33%	28%
Satisfied	44%	53%
Very satisfied	17%	11%

Notes: Same restrictions as in Table **??**. Gallup Poll is available at *http://www.galluppoll.com/content/ci=14548*. Number of observations in Gallup poll is not published. The answer categories in the Gallup poll were (Very dissatisfied / somewhat dissatisfied / somewhat satisfied / very satisfied).

Table 3: Income and Income needed to live well

Income Category (RMB)	Household Income	Income needed to live well
less than 2K	24.45%	6.02%
2K - 3K	33.23%	24.99%
3K - 4K	17.03%	19.67%
4K - 6K	10.82%	18.64%
6K - 8K	8.20%	17.24%
8K - 10K	3.45%	7.59%
more than 10K	2.82%	5.85%
imputed mean	3,379	4,780
imputed SD	2,309	2,508

Notes: $N = 1,914$, same restrictions as in Table 1. Mean was imputed using midpoints in each of the categories with a closed interval, RMB 1,000 for the bottom category, and RMB 10,000 for the top category.

Table 4: Satisfaction with Life and Income

Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**		
Earn a lot less than friends			-0.291**	-0.251**	-0.276**		
			(0.040)	(0.045)	(0.056)		
Earn somewhat less than friends			-0.326**	-0.293**	-0.313**		
			(0.029)	(0.031)	(0.047)		
Earn somewhat more than friends			0.117**	0.070**	0.087		
			(0.023)	(0.025)	(0.059)		
Earn a lot more than friends			0.220**	0.188**	0.207**		
			(0.032)	(0.038)	(0.067)		
					Interacted dummy variables		
					earns less than friends	earns same as friends	earns more than friends
2K < Income < 3K	0.115**	0.098**	0.058*	0.058	0.052	0.073	0.014
	(0.028)	(0.031)	(0.026)	(0.030)	(0.050)	(0.042)	(0.062)
3K < Income < 4K	0.189**	0.177**	0.098**	0.110**	0.106	0.105	0.086
	(0.032)	(0.039)	(0.031)	(0.038)	(0.075)	(0.053)	(0.068)
4K < Income < 6K	0.249**	0.240**	0.140**	0.166**	0.223**	0.080	0.183**
	(0.036)	(0.043)	(0.036)	(0.042)	(0.086)	(0.068)	(0.068)
6K < Income < 8K	0.347**	0.358**	0.210**	0.262**	0.423**	0.226**	0.233**
	(0.036)	(0.044)	(0.037)	(0.044)	(0.143)	(0.066)	(0.067)
8K < Income	0.328**	0.359**	0.177**	0.245**	0.537**	0.217*	0.191**
	(0.041)	(0.050)	(0.042)	(0.051)	(0.142)	(0.086)	(0.074)
Demographic controls	No	Yes	No	Yes	Yes		
Joint significance of relative income	–	–	$p < 0.001$	$p < 0.001$	$p < 0.001$		
Significance of income profile	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p = 0.012$	$p < 0.001$
Profile is different from profile for individuals who earn less than friends	–	–	–	–	reference group	$p = 0.189$	$p = 0.317$
N	2,212	1,914	2,212	1,914	1,914		
R^2	0.052	0.138	0.161	0.209	0.214		

Notes: Robust standard errors in parentheses. * and ** indicate significance at the 5% and 1% levels, respectively. The reference category for income is less than 2,000 Yuan/month. The reference category for relative income is earning about the same as one's friends. Demographic controls are (number of categories): gender (3), marital status (4), education (3), age ranges (5), labor market status of head of household (4), lifestyle (4). See Table A1 for the coefficients on the control variables. In column (5), the income profile is interacted with relative income, for which earning less and much less is condensed into one dummy variable, as is earning more and earning much more. For convenience, the fully interacted profiles are displayed next to each other.

Table 5: Income Needed to Live Well

Variable	**(1)**	**(2)**	**(3)**
Earns a lot less than friends		1,311.926**	1,428.733**
		(209.013)	(234.361)
Earns somewhat less than friends		760.564**	670.054**
		(139.063)	(149.425)
Earns somewhat more than friends		-20.278	213.7049
		(113.886)	(121.405)
Earns a lot more than friends		280.026	560.496*
		(252.237)	(275.055)
2K < Income < 3K	726.461**	841.013**	586.905**
	(118.276)	(116.506)	(136.956)
3K < Income < 4K	1,399.638**	1,578.381**	931.490**
	(144.489)	(147.249)	(187.390)
4K < Income < 6K	2,127.323**	2,321.306**	1,625.448**
	(173.582)	(179.749)	(213.387)
6K < Income < 8K	2,432.786**	2,650.175**	1,936.642**
	(210.010)	(215.149)	(244.847)
8K < Income	3,660.621**	3,837.53**	3,046.792**
	(245.367)	(260.744)	(288.966)
Demographic controls	No	No	Yes
Joint significance of relative income	–	$p < 0.001$	$p < 0.001$
Significance of income profile	$p < 0.001$	$p < 0.001$	$p < 0.001$
Desired income increases linearly with income level	$p < 0.001$	$p < 0.001$	$p < 0.001$
N	2,293	2,293	1,955
R^2	0.162	0.189	0.256

Notes: Robust standard errors in parentheses. * and ** indicate significance at the 5% and 1% levels, respectively. The reference category for income is less than 2,000 Yuan/month. The reference category for relative income is earning about the same as one's friends. Same demographic controls as in Table 2.

Table 6: Relative Income Interacted with Time Spent with Friends, Family, and Business Associates

Variable	**Interacted variable**	**Friends**	**Family**	**Business**
Earns less than friends	Socializes often	-0.311**	-0.327**	-0.240**
		(0.049)	(0.044)	(0.064)
	Socializes little	-0.284**	-0.254**	-0.276**
		(0.041)	(0.045)	(0.043)
Earns more than friends	Socializes often	0.046	0.040	0.175**
		(0.048)	(0.042)	(0.052)
	Socializes little	0.165**	0.205**	0.055
		(0.037)	(0.042)	(0.043)
Socializes often		0.012	0.063	-0.058
		(0.051)	(0.047)	(0.058)
Demographic controls		Yes	Yes	Yes
Socializing often is different from socializing little (high relative earners)		$p = 0.047$	$p = 0.004$	$p = 0.069$
Socializing often is different from socializing little (low relative earners)		$p = 0.674$	$p = 0.242$	$p = 0.645$
Socializing often is different from socializing little (joint test)		$p = 0.130$	$p = 0.0162$	$p = 0.184$
N		1,542	1,537	1,491
R^2		0.214	0.214	0.218

Notes: Robust standard errors in parentheses. * and ** indicate significance at the 5% and 1% levels, respectively. For friends and business, "socializing often" means more than twice per month. For family, it means more than once per month. "Socializing little" is the converse in all three cases. A value of zero is entered for respondents who answered "Don't Know" to the socializing questions. To control for these responses in all six equations, we include a separate dummy variable as well as this dummy variable's interactions with the relative income variables and the income profile. The entire income profile is also included in all six regressions, as is the interaction between the socializing variable of interest and the income profile. "Demographic controls" refers to the same controls as in Table 2.

Table 7: Socializing with Business Associates Affects Happiness Differently than Socializing with Family and Friends

Variable	**Interacted variable**	**Friends**	**Family**
Earns less than friends	Socializes often	-0.038 (0.062)	-0.070 (0.063)
Earns more than friends	Socializes often	-0.108 (0.057)	-0.168** (0.059)
Earns less than friends	Socializes often (business)	0.051 (0.077)	0.054 (0.077)
Earns more than friends	Socializes often (business)	0.104 (0.066)	0.137* (0.067)
Earns less than friends		-0.274** (0.052)	-0.253** (0.055)
Earns more than friends		0.113* (0.046)	0.148** (0.050)
Socializes often		0.001 (0.053)	0.063 (0.048)
Socializes often (business)		-0.080 (0.046)	-0.093* (0.046)
Demographic controls		Yes	Yes
Business effect is different from friend/family effect (high relative earners)		$p = 0.025$	$p = 0.001$
Business effect is different from friend/family effect (low relative earners)		$p = 0.369$	$p = 0.226$
Business effect is different from friend/family effect (joint test)		$p = 0.081$	$p = 0.006$
N		1,481	1,484
R^2		0.228	0.227

Notes: Robust standard errors in parentheses. * and ** indicate significance at the 5% and 1% levels, respectively. For friends and business, "socializing often" means more than twice per month. For family, it means more than once per month. We include all controls from Table 4, including those for income and for responses of "Don't Know" to the socializing questions.

Figure 1: Income relative to one's closest friends

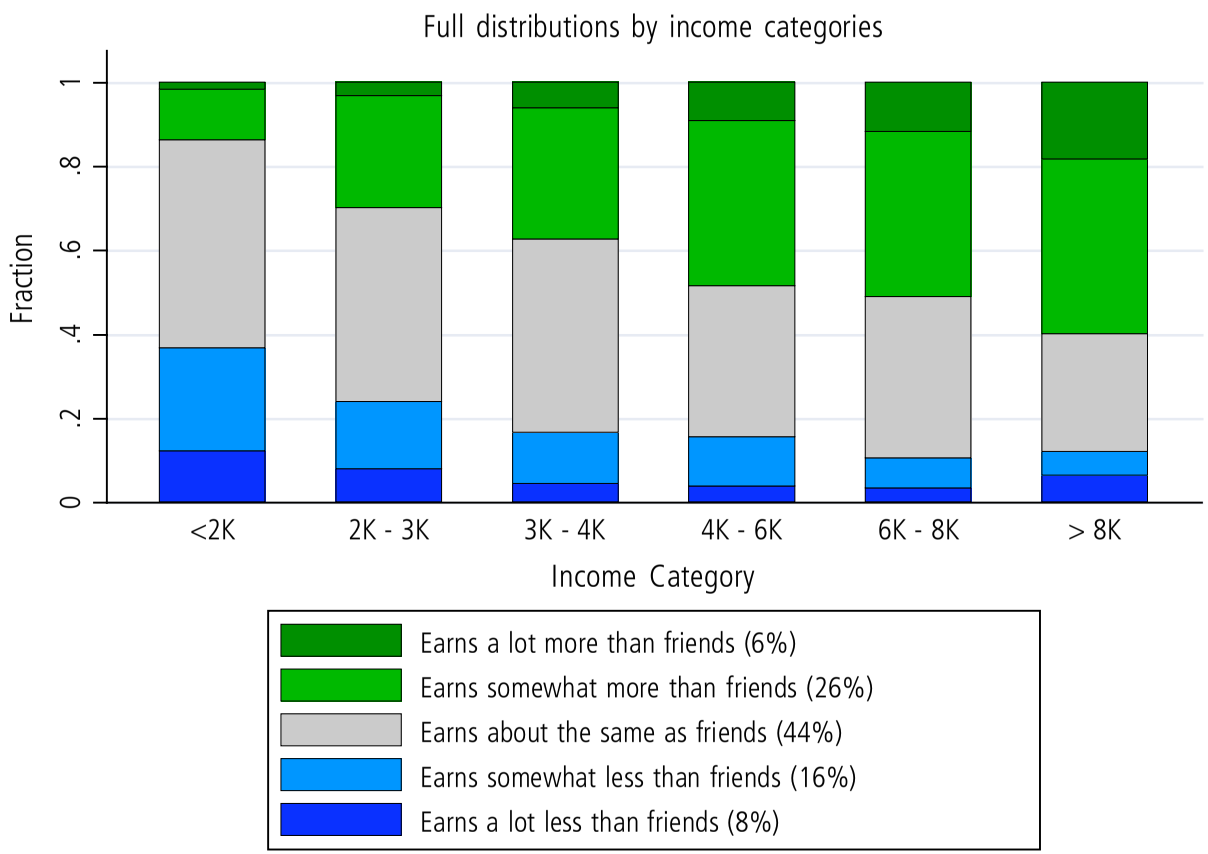

Figure 2: Satisfaction with Life and Income.

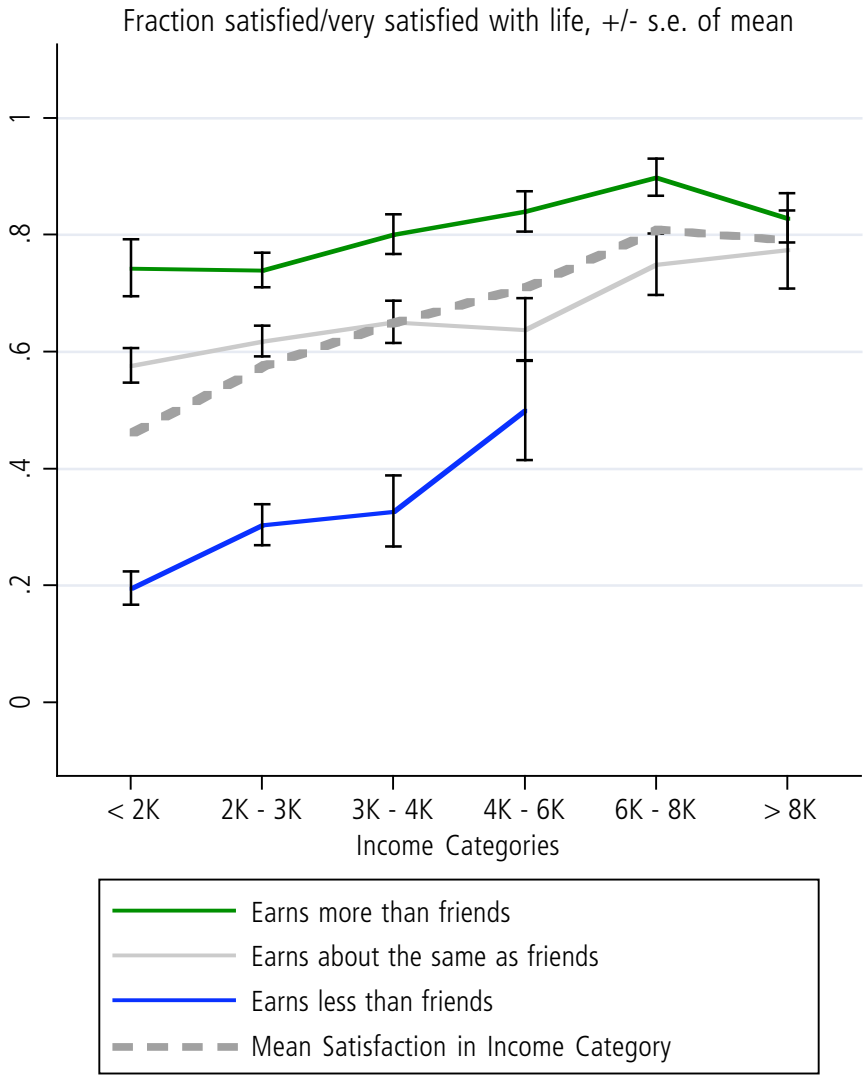
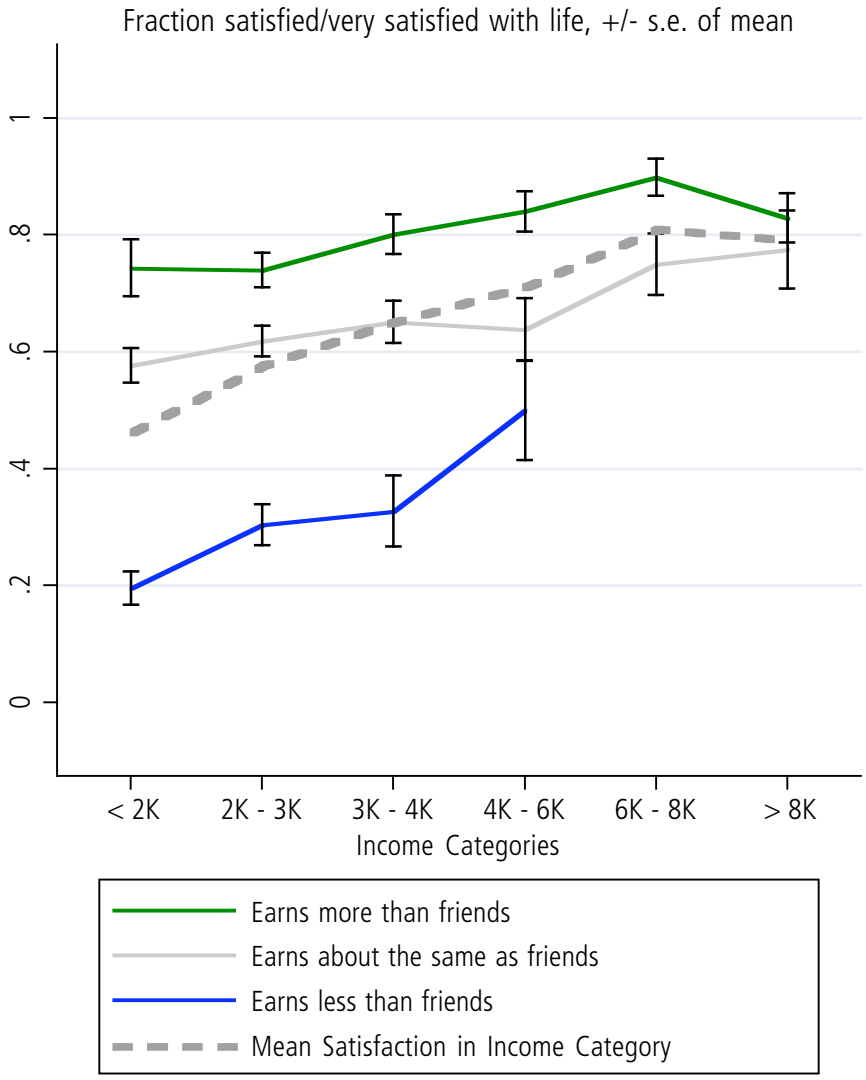
Figure 3: Monthly income needed to live well