IARIW-Bank of Korea Conference "Beyond GDP: Experiences and Challenges in the Measurement of Economic Well-being," Seoul, Korea, April 26-28, 2017

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Paper prepared for the IARIW-Bank of Korea Conference

Seoul, Korea, April 26-28, 2017

Session 3B: Well-being in Asia

Time: Wednesday, April 26, 2017 [Afternoon]

Income Inequality and Subjective Well-being in Urban China: Changes in the 2000s

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Paper Abstract:

Despite its enormous success in GDP growth, last three decades witnessed an increasing level of income inequality in China. However, previous studies observed a positive effect of general income inequality (as measured by county/city-level Gini coefficients) on subjective well-being in both rural and urban China. How does it come? And does the positive effect of inequality still exist later?

This study uses two cross-sectional datasets from a national survey program, and finds that compared with 2002, general income inequality turns to have a negative impact on the subjective well-being of urban Chinese in 2007, which is robust to alternative model and other inequality measures. This contrast indicates that urban Chinese have lowered their tolerance for income inequality during the 2000s, and suggests that the "tunnel effect" is no longer prevalent. By analyzing happiness indicator, this study provides evidence of the changing attitudes to inequality in the post-reform China. Whether a nation's subjective well-being is positively affected by inequality is highly related with the fact that whether an economy can still provide hope of getting better off for all.

Keywords: Inequality, Subjective well-being, Happiness, Tunnel effect, China

1 Introduction

It is widely known that China has experienced a steady increase of income inequality during the past decades. The national Gini coefficient is 0.38 in 1998, and surges to 0.45 in 2002. In 2007, the Gini coefficient of household income per capita is reaching 0.49 (Li *et al.* 2013; Xu and Yue 2013; Knight 2014). Despite the overwhelming economic growth, empirical evidence suggests that happiness in China has decreased (Brockmann *et al.* 2009). It is hence natural to assume that China's imbalanced growth did not make its people feel happier. However, Knight and Gunatilaka (2010a), as well as Jiang *et al.* (2012) found that in the early 2000s income inequality, measured by the Gini coefficients at the county/city-level, affected rather positively individual's subjective well-being when identity-related inequality and other social/personal characteristics were controlled for.

According to the literature, the positive inequality-happiness relationship is not universal. It seems to be specific in some transition economies or in societies with higher perceived mobility. Grosfeld and Senik (2010) found in Poland that in the first stage of transition process (1992-1996), income inequality positively correlates with satisfaction level. Likely in Russia, Senik (2004) found that the reference group's income exerts a positive influence on individual well-being. Also interesting is Alesina, Di Tella and MacCulloch (2004)'s finding that the poor in Europe are more concerned with inequality than in the US, and that the US rich are bothered by inequality. A possible explanation for the positive inequality-happiness relationship is the Hirschman and Rothschild (1973)'s tunnel effect, indicating that inequality can be a demonstration of future improvement, providing hope and gratification even for those who are relatively left behind.

This study, using a model almost the same with Jiang *et al.* (2012), finds that the positive inequality-happiness relationship is no longer prevalent in urban China by the end of 2000s. No more tendency is found that the poor prefer inequality and the middle-aged and the elderly become significantly bothered by inequality. Generally, it is possible that the tunnel effect has weakened in urban China.

2 Literature Review

There has been a growing body of literature that focuses on the influencing factors of subjective well-being in China. Empirical evidences indicate that social comparison plays an important part when individuals assess their life satisfaction. For Chinese people, absolute income positively correlates with their happiness (Appleton and Song 2008; Otis 2016), however, their level of happiness can be adjusted in social compare: on the one hand, comparing with their reference group, falls in relative income would lead to lower happiness (Brockmann *et al.* 2009; Knight and Gunatilaka 2011; Huang *et al* 2016; Jin, 2016); on the other hand, comparing with themselves, progress in the past and income expectations in the future are closely associated with present happiness (Knight and Gunatilaka 2010b; Frijters *et al.* 2012; Liu and Shang 2012). Thus, income inequality, as a general measure reflecting "others' income and my position", would also influence individual's subjective well-being.

In recent years, the role of income inequality has received increasing attention in Chinese happiness studies. However, these studies provide mixed findings. Using data from the Chinese Household Income Project 2002 (CHIP 2002), two studies reported a positive and significant role of Gini coefficient. Knight and Gunatilaka (2010a) discovered that an increase in the Gini coefficient at county level would enhance the subjective well-being of Chinese rural residents. Jiang *et al.* (2012) explored the role of income inequality in urban China. They divided income inequality into general inequality (measured by city-level Gini coefficient) and between-group inequality (measured by the income ratio between urban residents and migrants living in a same city, which reflects the identity-related income inequality). After they controlled for identity-related between group inequality and other individual, household, and city-level characteristics, general inequality was found to be positively associated with happiness. By contrast, using data from the Chinese General Social Survey 2005 (CGSS 2005), Wu and Li (2013) found that a higher Gini coefficient leads to reduction in happiness. Wang *et al.* (2015) made a further investigation using CGSS 2006 data and

found an inverted U-shaped association between Gini coefficient and subjective well-being, which holds for both urban and rural individuals.

Moreover, studies conducted in other countries also yield ambiguous results. The inequality-happiness relationship is found to be negative, positive, or without significance among different nations. The negative effect is found in a number of studies (Morawetz *et al.* 1977; Hagerty 2000; Verme 2011; Oishi *et al.* 2011). For instance, Graham and Felton (2006) found that inequality has negative effects on happiness in Latin America. Oshio and Kobayashi (2011) found in Japan that individuals who live in areas of high income inequality tend to report lower happiness. However, some studies indicated that there is no significant relationship between happiness and inequality. Using data from 119 nations, Berg and Veenhoven (2010) found little relationship between income inequality and average happiness in nations. Schwarze and Härpfer (2007) also pointed out that there is no clear evidence to say whether people are negatively affected by income inequality in Germany. Several studies demonstrated that the positive effect of inequality also exists. In Poland, Grosfeld and Senik (2010) observed a positive role of inequality during the first stage of transition (1992-1996). Using data from the British Household Panel Survey, Clark (2003) came up with a positive linkage between subjective well-being and inequality, and found the positive effect is stronger for the young, the below average income earners, and those whose incomes have the most mobility.

The interpretation of the positive/negative effect of income inequality largely relies on two different hypotheses. The relative deprivation theory, describing the feeling of being deprived when others become better-off, help to explain when people feel unhappy toward income inequality (Runciman 1966; Yitzhaki 1979; Walker and Smith 2002). In empirical studies this effect is generally captured by estimating the role of relative income. Empirical findings from different countries have lent some support to this claim (Alesina *et al*. 2004; Fahey and Smyth 2004; Morawetz *et al*. 1977; Oshio and Kobayashi 2010; Schwarze and Härpfer 2007).

By contrast, the tunnel effect theory argues that income inequality can serve as a sign of better prospects for future, which would provide demonstrations for individuals

and raise their subjective well-being. Hirschman and Rothschild (1973) used an analogy for understanding: when caught in a traffic jam in a two-lane tunnel, when the cars in the other lane begin to move, the stayed people would feel better because they are expecting to move soon. The tunnel effect theory suggests that in the early stage of rapid economic development when inequality is apt to increase sharply, society's tolerance for such disparity can be substantial, even those who are currently left-behind may have positive attitudes toward inequality. However, the tunnel effect is bound to be ephemeral. When people see that the disparities cannot be narrowed, the tunnel effect would decay (Hirschman & Rothschild 1973).

It seems that income inequality has two competing effects on individual subjective well-being. The key is whether others' better-off would be translated into positive or negative information for individuals themselves. When the relative deprivation effect is stronger, improvement of others would reduce the well-being of individuals. When the tunnel effect is stronger, advances of others supply information about a more benign external environment; receipt of this information produces gratification; and this gratification overcomes, or at least suspends, envy—the basic emotion that makes one feel relatively deprived (Hirschman and Rothschild, 1973). In this way, current left-behind does not necessarily serve as a disappointing message. However, previous studies haven't provided enough clues on the measurement of tunnel effect. Empirical studies on the tunnel effect hypothesis is still limited.

China is particularly suitable for analyzing the role of inequality on happiness over time. According to Hirschman and Rothschild (1973), the tunnel effect only exists (or be strong) when all groups in a society are convinced (at least for a while) to have the common opportunity of improving their well-being. Besides, the society must be in the experience of sustained growth. Otherwise, if the total wealth of a society is certain, someone's better-off would necessarily cause the loss in some others. These two conditions are largely satisfied in the post-reform China. When China embarked on the reform, huge social mobility opportunities are provided. Together with the official slogan "The Rich First Pushing Those Being Rich Later", the rising inequality would not necessarily cause a big problem. However, as inequality level continues to increase,

Chinese people's tolerance for inequality might change over time. Whether the positive effect of general income inequality still exists (or whether the tunnel effect is still prevalent) in China needs to be explored.

To address the research question above, this study specifically analyzes the impact of income inequality on subjective well-being in urban China, with special attention paid to the significance of Gini coefficients and the interpretation regarding the tunnel effect. In order to make a longitudinal comparison and to alleviate possible bias caused by changing survey programs, cross-sectional data from the 2002 and 2007 Chinese Household Income Projects are used for empirical estimations. Besides, population subgroups (i.e. the urban residents and rural-urban migrants, different age groups and income groups) are examined respectively.

3 Data and Methodology

3.1 Data

The data used in this study come from the Chinese Household Income Project 2002 and 2007 (CHIP 2002 and CHIP 2007). These projects were organized by the Chinese Academy of Social Science, and carried out by the National Bureau of Statistics (NBS)[1]. CHIP data contain comprehensive socio-economic information on individual and household levels, including the information of demographic characteristics, income source, consumption, expenditures, labor force, employment and social welfare. Besides, there is an attitude questions module including the rating of "happiness" in the surveys of CHIP 2002 and CHIP 2007. Both CHIP 2002 and CHIP 2007 are composed of three parts: the Urban Household Survey, the Rural Household Survey and the Migrant Household Survey[2], covering the eastern, central and western regions of China. While the urban household survey in CHIP 2002 covers 62cities, only 27 of them are included in the migrant household survey. In CHIP 2007 this gap also exists, the migrant data is only available for 15 surveyed cities. Thus, this study only selects the cities contained in the migrant survey, and matches the migrant data with the urban data

[1] Except for the migrant household survey in 2007, which was conducted by a survey company.

[2] *Migrant* refers to the rural-urban migrants under Chinese context.

according to their city codes. To be in consistence with the study of Jiang *et al.* (2012), *Honghe Minority Autonomous Prefecture* is not included in 2002. Thus, there are 26 cities in 2002 and 15 cities in 2007 remained for analysis.

3.2 Measures

3.2.1 Subjective Well-Being

The dependent variable "Happiness" stands for personal ratings of subjective wellbeing, captured from the Likert-scale question: "Are you happy when you consider each aspect of your life?"[3]. However, different designs of the two surveys need to be noticed. In 2002, only the household head (or the main member of the household) was selected to answer the question of "happiness". While in 2007, this question went for every household member who was no less than 16 years old and was on the scene. Besides, choices for the answer were five-point scaled in CHIP 2002, but were four-point scaled in CHIP 2007[4]. In consistence with previous studies, we use scores of happiness in regressions based on cardinal values assigned to qualitative assessment, which are 0, 1, 2, 3, 4 for CHIP 2002 and 1, 2, 3, 4 for CHIP 2007 respectively. However, for descriptive analysis, ratings of happiness are recoded into an equivalent scale ranging from 0 to 1 in order to establish an effective comparison (see Table 1).

Table 1 Equivalent happiness scores (2002 & 2007)

Year	Total	Migrants	Urban Residents	Urban Residents/Migrants	ANOVA test
2002	0.612	0.592	0.622	1.051	p=0.000
	(n=5881)	(n=1939)	(n=3942)		
2007	0.746	0.742	0.750	1.011	p=0.019
	(n=12890)	(n=6160)	(n=6730)		

Data source: CHIP 2002 & 2007

Notes: Equivalent measures of happiness scores based on cardinal values are recoded as follows: in 2002, "very happy" =1, "happy" =0.75, "so-so" =0.5; "not happy" =0.25, "not happy at all" =0; in 2007, "very happy" =1; "fairly happy" =0.6667; "not very happy" =0.3333; "not happy at all" =0. The last column provides the p-value for the ANOVA test of equal means between migrants and urban residents.

[3] This is the expression in CHIP 2007. In CHIP 2002, the expression of this question is: "Generally speaking, how happy do you feel?"

[4] In CHIP 2002, the five responses were "very happy", "happy", "so-so", "not very happy" and "not happy at all". In CHIP 2007, four possible options included "very happy", "fairly happy", "not very happy", and "not happy at all".

Table 1 shows the mean values of the equivalent happiness scores in CHIP 2002 and CHIP 2007. Urban residents enjoy a higher level of subjective well-being than urban-rural migrants in both years. The ANOVA test shows such difference is statistically significant. However, the "happiness gap" between urban residents and migrants has been narrowed from 2002 to 2007, with the ratio of mean happiness scores decreases from 1.051 to 1.011. Table 1 suggests an increase in the average level of happiness from 2002 to 2007, though it might be due to (or partly due to) the missing middle option in CHIP 2007 survey.

3.2.2 Income Inequality

In order to measure the degree of general inequality, city-level Gini coefficients are calculated based on the household income per capita. For both urban residents and migrants, income includes labor income, net income from family business, asset income and transfer income. All households are taken into account, including the urban residents and the rural-urban migrants living in a same city.

According to Jiang *et al.* (2012), identity-related inequality, or between group inequality (BI), as measured by the ratio between the mean incomes of urban residents and migrants within the same city, had significant impact on individual happiness in 2002. As a socio-economic indicator to measure the inequality generated by the *hukou* system (the household registration system in China) and the gap between Chinese urban and rural societies, BI is also used as a control variable in our model. Descriptive statistics of city-level Gini coefficients and BI are listed in Table2.

Table 2 Income inequality at city level (2002 & 2007)

Year	Variable	Obs.	Mean	*SD*	Min.	Max
2002	BI	26	1.779	0.464	1.027	3.060
	City-level Gini	26	0.333	0.031	0.274	0.392
2007	BI	15	1.276	0.289	0.974	2.015
	City-level Gini	15	0.322	0.020	0.283	0.358

Data source: CHIP 2002 & 2007

Notes: BI denotes between group inequality, measured by the ratio between the mean incomes of urban residents and migrants within the same city. City-level Gini represents general inequality, using household income per capita for calculation. All households include urban residents and migrants.

A noteworthy finding from Table 2 is the narrowed BI. It indicates that the average income of migrants have been relatively raised during the five years, but urban residents are still largely better off with an average income ratio of 1.779 in 2002 and 1.276 in 2007[5]. Partly due to the narrowed between group inequality, city-level Gini of the selected cities is not astoundingly high in 2007, with even a smaller average value. According to Li *et al.* (2013) who measured the income inequality level of China using CHIP data, the urban Gini coefficient is both 0.33 in 2002 and 2007 regarding all surveyed cities, taking migrants into account.[6]

3.2.3 Control Variables

There are two sets of control variables. The fist includes individual and household characteristics. Following the literature (*eg.* Frey and Stutzer 2002; Alesina *et al.* 2004; Knight *et al.* 2009; Jiang *et al.* 2012), age, age squared, gender, marital status, years of schooling completed, health condition and employment status are controlled. Besides, *Hukou* dummy is used in order to distinguish the different "identities" as a result of *hukou* system. The dummy variable "Urban *hukou*" equals to 1 if the respondent has urban *hukou* status and 0 if he/she has rural *hukou* status. The natural logarithm of annual household per capita income is also considered to control for the influence of absolute income. In CHIP 2002, the respondents were asked about the anticipation of their income in next five years. Choices include "rapidly increase", "small increase", "unchanged" and "decrease". A set of dummies are included to account for the effect of expected income. Besides, the interaction between Gini coefficients and expected income are also included to measure the potential tunnel effect in 2002. The descriptive statistics of individual and household characteristics are displayed in Table 10 and Table 11 in the Appendix.

Another set of variables is included to control for the characteristics of the sampled cities. Regional features vary significantly in China due to different geographical

[5] In the Migrant Household Survey of CHIP 2007, only *monthly* household income is available. Annual household income per capita was computed based on this data. However, there might be the worry of exaggerating their actual income.

[6] In their study, income inequality was weighted by province and region using population shares of urban natives and long-term stable migrants.

conditions and social-economic endowments. These factors may affect the extent of inequality as well as individual well-being through certain channels. In order to alleviate the omitted variable bias, a vector of city-level variables is brought into the model, including the per capita GDP, population growth rate, city size, and a dummy variable indicating whether the city locates in the western or central region of China.[7] Descriptive statistics for city level controllers are listed in Table 12 and Table 13 in the Appendix.

3.3 Methods

This paper applies the following regression model to estimate the impact of income inequality on happiness in 2002 and 2007, which is in line with the study of Jiang *et al.* (2012):

$$Happiness_{ij} = a_0 + \alpha_1 \cdot Gini_j + \alpha_2 \cdot BI_j + \beta \cdot X_{ij} + \gamma \cdot Z_j + \varepsilon_{ij}$$

where subscripts i and j denote individuals and cities respectively. The dependent variable $Happiness_{ij}$ stands for the personal rating of subjective wellbeing. $Gini_j$ and BI_j stands for the Gini coefficient (general inequality measure) and urban-migrant mean income ratio (between group inequality measure) in each city respectively. The set X_{ij} denotes the individual and household characteristics. The second set Z_j is a vector controlling characteristics among different cities.

In order to compare with previous studies, the ordinary least squares (OLS) regressions are used for main estimations, where the ratings of subjective well-being are treated as a cardinal measure. Considering that it is more natural to treat happiness scores as ordinal numbers, ordered probit models are also used for the robustness check.

4 Empirical Results

4.1 Income Inequality and Subjective Well-being

[7] City-level data are obtained from the *China City Statistical Yearbook 2003* and *China City Statistical Yearbook 2008*. The population growth rate is measured by the annual growth rate of resident population in 2002 and 2007. City size is denoted by the dummy variable "Big city", indicating whether the city had a population of more than 1.5 million non agricultural residents in 1990. Region dummies "Western" and "Central" denote whether the city locates in western China or central China, and the omitted variable is eastern China.

Table 3 reports the OLS estimation results. The first three columns exhibit regressions using the data from CHIP 2002. To begin with, column (1) repeats the baseline model in the study of Jiang *et al.* (2012) for comparison with the existing literature. Considering the differences in survey questions (eg. questions like the income expectation and political background are not included in CHIP 2007), only the common variables at individual and household levels are selected in column (2). Estimation with city level control variables is shown in column (3). Column (4) and (5) report regression results with CHIP 2007 data, using the same control variables in column (2) and (3) respectively.

Comparing the estimations for both years, the most remarkable differences are the sign and significance of city-level Gini. In consistence with Jiang *et al.*, city-level Gini is found to raise urban happiness in 2002, and this impact stays robust no matter how the control variables are changed. However, as shown in column (4), city-level Gini is insignificant with a negative sign in 2007. After controlled for city characteristics, the negative impact of city-level Gini becomes statistically significant (at 10% significance level). General inequality tends to be a negative factor reducing the happiness of urban Chinese, which indicates that the tolerance for general inequality has been lowered during the five-year period. As researchers referred to the positive role of Gini in 2002 as the operation of "tunnel effect" (Knight and Gunatilaka 2010a; Jiang *et al.* 2012), this finding may suggest that the "tunnel effect" is no longer significant in 2007.

Findings on other variables are largely in consistence with previous literature. Between group inequality (BI) has a negative impact on happiness in both 2002 and 2007. Compared with females, males tend to report lower happiness scores. Age has a U-shaped effect on life satisfaction. Among different marital status, compared with unmarried persons, married persons enjoy higher subjective well-being, whereas divorcement reduces individual happiness significantly. Being widowed also harms one's subjective well-being, but this effect is not significant in 2007. Health always significantly correlates with happiness, people who say they are in good health are happier than who reporting their health condition as so-so, vice versa. Besides, unemployment leads to lower scores of individual happiness.

Some other interesting changes were also found when comparing the two years' results: in 2002 having an urban *hukou* is insignificant with happiness, while in 2007 urban *hukou* is positively associated with happiness, which is in line with the study of Wang *et al.* (2015); education doesn't have a significant effect on subjective well-being

Table 3 The impact of income inequality on subjective-wellbeing (2002 & 2007)

Dependent Variable: Happiness Score					
	2002			2007	
	(1)	(2)	(3)	(4)	(5)
BI	-0.0608***	-0.0546**	-0.0663**	-0.0790***	-0.0966**
	(0.0226)	(0.0230)	(0.0333)	(0.0227)	(0.0468)
Gini	1.352***	1.488***	1.743***	-0.329	-1.190*
	(0.320)	(0.330)	(0.419)	(0.323)	(0.630)
Urban *hukou*		-0.129	-0.139	0.0328**	0.0282*
		(0.0815)	(0.0819)	(0.0151)	(0.0151)
Male	-0.0495**	-0.0302	-0.0321	-0.0324***	-0.0346***
	(0.0222)	(0.0226)	(0.0227)	(0.0109)	(0.0109)
Age	-0.0261***	-0.0351***	-0.0347***	-0.0178***	-0.0169***
	(0.00581)	(0.00582)	(0.00584)	(0.00269)	(0.00269)
Age-*squared*	0.000326***	0.000429***	0.000425***	0.000197***	0.000188***
	(0.0000593)	(0.0000596)	(0.0000598)	(0.0000277)	(0.0000277)
Married	0.0915*	0.0604	0.0561	0.173***	0.167***
	(0.0551)	(0.0563)	(0.0565)	(0.0208)	(0.0208)
Divorced	-0.247**	-0.272**	-0.276**	-0.171***	-0.179***
	(0.109)	(0.110)	(0.110)	(0.0532)	(0.0530)
Widowed	-0.171*	-0.201**	-0.207**	-0.0595	-0.0573
	(0.0997)	(0.102)	(0.102)	(0.0502)	(0.0500)
Years of education	0.000492	0.00493	0.00454	0.0116***	0.0121***
	(0.00373)	(0.00377)	(0.00376)	(0.00188)	(0.00189)
Good health	0.214***	0.248***	0.242***	0.236***	0.231***
	(0.0251)	(0.0258)	(0.0259)	(0.0132)	(0.0132)
Bad health	-0.150***	-0.164***	-0.163***	-0.196***	-0.203***
	(0.0533)	(0.0542)	(0.0539)	(0.0369)	(0.0367)
Unemployed	-0.0164	-0.0936*	-0.0924*	-0.0695**	-0.0627**
	(0.0305)	(0.0504)	(0.0505)	(0.0317)	(0.0317)
Log household income per capita	0.286***	0.309***	0.326***	0.0647***	0.0798***
	(0.0175)	(0.0180)	(0.0191)	(0.00975)	(0.0102)
GDP per capita/10^4			0.0534		-0.0191**
			(0.0598)		(0.00891)
Population growth rate			0.00690		0.00752
			(0.0322)		(0.00948)
Big city			0.0248		-0.0436***
			(0.0300)		(0.0166)
Central			-0.0245		-0.0150
			(0.0446)		(0.0260)
Western			-0.0915*		0.0363
			(0.0551)		(0.0361)
Communist	0.0884***				
	(0.0265)				
Expect rapid income increase	0.343***				
	(0.0596)				
Expect small income increase	0.106***				
	(0.0232)				

Table 3 continued

	2002			2007	
	(1)	(2)	(3)	(4)	(5)
Expect income decrease	-0.352***				
	(0.0340)				
Living area per capita	0.00391***				
	(0.00120)				
Constant	-0.109	-0.0935	-0.187	2.768***	3.007***
	(0.228)	(0.230)	(0.234)	(0.168)	(0.267)
Observations	5,881	5,881	5,881	12,890	12,890
R-squared	0.143	0.103	0.105	0.062	0.066

Notes:

1. Dependent variables: happiness scores based on cardinal values as follows: in 2002, "very happy" =4, "happy" =3, "so-so" =2; "not happy" =1, "not happy at all" =0; in 2007, "very happy" =4; "fairly happy" =3; "not very happy" =2; "not happy at all" =1.
2. Robust standard errors are in parentheses.
3. ***, ** and * denote statistical significance at 1%, 5% and 10% levels respectively.

in 2002, but is found to raise individual life enjoyment significantly in 2007; in 2007, people living in a big city feel less happy than those who do not. [8]

4.2 Robustness Check

4.2.1 The Effect of Income Inequality in 2007

To investigate the robustness of the negative impact of general inequality in 2007, this study further utilized alternative models with different inequality estimators. Column (1) in Table 4 displays the ordered probit regression results using the last function in Table 3. The negative significance (at 10% significance level) of Gini coefficients can still be observed. Rather than relying on a single measure of income inequality, city-level Theil index and city-level Atkinson index (ε=0.5) are calculated as alternative inequality indicators. All inequality indicators are calculated by household income per capita obtained from the datasets. Column (2) presents the odered probit regression using Theil index as the city-level inequality measure, and column (3) shows the results using Atkinson index. As shown in Table 4, after replacing Gini with Theil index/Atkinson index, the negative coefficient of the general inequality estimator becomes even more significant (at 1% significance level), providing additional evidence for the negative effect of income inequality on happiness in 2007.

[8] In 2007, the average happiness score (recoded from 0 to 1) of big city dwellers is 0.740, while the average happiness score of those who not living in big cities is 0.754. ANOVA test shows that this difference is significant at 1% level. See the definition of "big city" in footnote 7.

Table 4 The impact of income inequality on subjective-wellbeing, a robustness check (2007)

Dependent Variable: Happiness Score	(1) Odered probit Gini	(2) Odered probit Theil index	(3) Odered probit Atkinson index
BI	-0.192**	-0.159*	-0.202**
	(0.0900)	(0.0848)	(0.0868)
Gini	-2.359*		
	(1.213)		
Theil		-1.431***	
		(0.398)	
Atkinson			-5.518***
			(1.626)
Urban *hukou*	0.0546*	0.0543*	0.0549*
	(0.0292)	(0.0292)	(0.0292)
Male	-0.0642***	-0.0649***	-0.0646***
	(0.0210)	(0.0210)	(0.0210)
Age	-0.0320***	-0.0319***	-0.0320***
	(0.00514)	(0.00514)	(0.00514)
Age-*squared*	0.000354***	0.000354***	0.000354***
	(0.0000529)	(0.0000529)	(5.0000529)
Married	0.316***	0.316***	0.317***
	(0.0398)	(0.0397)	(0.0398)
Divorced	-0.306***	-0.313***	-0.311***
	(0.0931)	(0.0931)	(0.0931)
Widowed	-0.0851	-0.0847	-0.0840
	(0.0900)	(0.0901)	(0.0901)
Years of education	0.0237***	0.0239***	0.0236***
	(0.00373)	(0.00372)	(0.00373)
Good health	0.440***	0.439***	0.438***
	(0.0251)	(0.0251)	(0.0251)
Bad health	-0.338***	-0.334***	-0.335***
	(0.0630)	(0.0629)	(0.0629)
Unemployed	-0.112*	-0.112*	-0.114*
	(0.0589)	(0.0589)	(0.0589)
Log household income per capita	0.155***	0.155***	0.155***
	(0.0197)	(0.0197)	(0.0197)
GDP per capita/10^4	-0.0378**	-0.0378**	-0.0463***
	(0.0171)	(0.0151)	(0.0163)
Population growth rate	0.0161	0.0134	0.0186
	(0.0181)	(0.0178)	(0.0180)
Big city	-0.0836***	-0.0870***	-0.0753***
	(0.0318)	(0.0275)	(0.0290)
Central	-0.0256	-0.0156	-0.0112
	(0.0500)	(0.0496)	(0.0499)
Western	0.0698	0.170**	0.117*
	(0.0696)	(0.0659)	(0.0644)
Constant cut1	-2.147***	-1.622***	-1.903***
	(0.516)	(0.269)	(0.312)
Constant cut2	-0.985*	-0.460*	-0.741**
	(0.514)	(0.267)	(0.310)
Constant cut3	0.888*	1.414***	1.133***
	(0.514)	(0.267)	(0.310)
Observations	12,890	12,890	12,890

Notes:

1. Dependent variables: happiness scores in 2007, treated as ordinal numbers.
2. Robust standard errors are in parentheses.
3. ***, ** and * denote statistical significance at 1%, 5% and 10% levels respectively.

To take advantage of the hierarchical data structure and account for the contextual effect on individual's assessment of inequality, this study also utilizes multi-level linear regressions for robustness check. While the city-level inequality measures, GDP per capita, population growth rate and regional dummies are employed as explanatory variables at the city level, socio-demographic and economic characteristics are employed as explanatory variables at the individual level. Regression results are listed in Table 14 in the Appendix. All multi-level linear regression models are set to have random intercepts. The multi-level models reveal similar findings with the OLS and the odered probit models. However, in 2007, the coefficient of Gini is negative but insignificant in the multi-level model. Alternative general inequality estimators Theil index and Atkinson index are both negative and significant at 1% significance level.

4.2.2 Common Cities in Both Surveys

One problem that may cause bias in comparison is that the surveyed cities in CHIP 2002 and CHIP 2007 are not identical. Only seven cities have been chosen in both survey programs. To alleviate the potential bias caused by different sampled cities in the two surveys and control for some unobservable regional fixed effects, this study examined the impact of general income inequality (measured by city-level Gini coefficients) on individual subjective well-being using the observations from the overlapped cities in the two surveys. OLS regression results are shown in Table 5. In the seven common cities, general income inequality displays opposite effects on individual subjective well-being in the two years. In 2002, the positive effect of city-level Gini is significant at 1% level. In 2007, city-level Gini is found to be negatively and significantly (at 1% level) correlated with individual happiness.

Table 5 The impact of income inequality on subjective-wellbeing, common cities

Dependent Variable: Happiness Score	(1) 2002 Common Cities	(2) 2007 Common Cities
BI	-0.227***	-0.504**
	(0.0633)	(0.228)
Gini	3.518***	-8.290***
	(1.056)	(1.466)
Urban *hukou*	-0.0282	0.0436**
	(0.0502)	(0.0203)
Male	-0.0431	-0.0197

Table 5 continued

	(0.0345)	(0.0149)
Age	-0.0194**	-0.0210***
	(0.00914)	(0.00364)
Age-*squared*	0.000271***	0.000229***
	(9.33e-05)	(3.72e-05)
Married	0.0503	0.191***
	(0.0849)	(0.0295)
Divorced	-0.352*	-0.208***
	(0.199)	(0.0713)
Widowed	-0.266*	-0.0549
	(0.155)	(0.0701)
Years of education	-0.000378	0.0134***
	(0.00594)	(0.00255)
Good health	0.289***	0.217***
	(0.0424)	(0.0190)
Bad health	-0.164*	-0.189***
	(0.0926)	(0.0495)
Unemployed	-0.276*	-0.119***
	(0.142)	(0.0413)
Log household income per capita	0.315***	0.0633***
	(0.0304)	(0.0143)
GDP per capita/10^4	0.106*	-0.147***
	(0.0625)	(0.0436)
Population growth rate	-0.0244	0.119***
	(0.138)	(0.0310)
Central	0.437**	-0.109
	(0.221)	(0.194)
Western	0.461***	-0.200
	(0.178)	(0.241)
Constant	-1.507***	6.385***
	(0.569)	(0.575)
Observations	2,093	6,663
R-squared	0.127	0.075

Notes:

1. Dependent variables: cardinal happiness scores in 2002 and 2007. In 2002, "very happy" =4, "happy" =3, "so-so" =2; "not happy" =1, "not happy at all" =0; in 2007, "very happy" =4; "fairly happy" =3; "not very happy" =2; "not happy at all" =1.
2. Observations are restricted to the seven common survey cities in CHIP 2002 and CHIP 2007. The seven cities are Wuxi, Hefei, Zhengzhou, Wuhan, Guangzhou, Chongqing, Chengdu, covering the eastern, central and western regions of China. Variable "Big City" is excluded to avoid collinearity with regional dummies.
3. Robust standard errors are in parentheses.
4. ***, ** and * denote statistical significance at 1%, 5% and 10% levels respectively.

4.3 Subsamples Analysis

What has been changed from 2002 to 2007 regarding people's attitudes that makes the city-level Gini a negative factor for happiness? In order to address this question, further regressions on different demographic/social-economic subgroups are analyzed in this section. Considering the substantial differences in many aspects between urban residents and rural-urban migrants, the effect of income inequality on happiness are examined respectively for these two groups. Besides, the inequality-happiness relationship is also estimated among different age groups and income groups, as age

and income are two natural scales for demographic and social-economic measure. Subsample regression results are listed in Table 6, Table 7 and Table 8.

Table 6 Subsample analysis for migrants and urban residents (2002 & 2007)

Dependent Variable: Happiness Score	(1) Migrants 2002	(2) Urban Residents 2002	(3) Migrants 2007	(4) Urban Residents 2007
BI	-0.144***	-0.0399	0.0547	-0.267***
	(0.0536)	(0.0430)	(0.0724)	(0.0614)
Gini	1.496**	1.686***	1.330	-3.206***
	(0.707)	(0.531)	(0.959)	(0.822)
Urban *hukou*	-0.0821	0.00977	0.0833	0.0340
	(0.111)	(0.110)	(0.0746)	(0.0345)
Male	0.0278	-0.0705**	-0.0362**	-0.0283**
	(0.0389)	(0.0278)	(0.0166)	(0.0144)
Age	-0.00708	-0.0489***	-0.0192***	-0.0182***
	(0.0139)	(0.00782)	(0.00574)	(0.00383)
Age-*squared*	0.0000927	0.000553***	0.000226***	0.000192***
	(0.000171)	(0.0000766)	(0.0000749)	(0.0000375)
Married	-0.00568	0.137	0.191***	0.110***
	(0.0788)	(0.0884)	(0.0271)	(0.0379)
Divorced	-0.318	-0.176	-0.275***	-0.179***
	(0.194)	(0.144)	(0.102)	(0.0657)
Widowed	-0.732**	-0.0897	-0.165	-0.0903
	(0.372)	(0.122)	(0.152)	(0.0609)
Years of education	0.00526	-0.00144	0.0211***	0.00644***
	(0.00736)	(0.00451)	(0.00370)	(0.00229)
Good health	0.109	0.252***	0.228***	0.226***
	(0.0685)	(0.0279)	(0.0243)	(0.0158)
Bad health	-0.0947	-0.160***	-0.228**	-0.195***
	(0.167)	(0.0569)	(0.0996)	(0.0386)
Unemployment	0.0107	-0.320***	0.235**	-0.0798**
	(0.0756)	(0.0909)	(0.0965)	(0.0332)
Log household income per capita	0.208***	0.422***	0.0322*	0.134***
	(0.0269)	(0.0276)	(0.0169)	(0.0132)
GDP per capita/10^4	0.00532	0.0821***	0.00290	-0.0375***
	(0.0317)	(0.0248)	(0.0136)	(0.0117)
Population growth rate	0.0297	-0.0178	-0.000702	0.0133
	(0.0499)	(0.0422)	(0.0148)	(0.0121)
Big city	0.00536	0.0281	-0.0991***	0.00249
	(0.0511)	(0.0371)	(0.0261)	(0.0208)
Central	-0.0187	-0.0102	-0.0233	-0.00489
	(0.0709)	(0.0579)	(0.0395)	(0.0342)
Western	-0.0943	-0.0785	0.0644	0.0283
	(0.0876)	(0.0706)	(0.0544)	(0.0479)
Constant	0.413	-0.788**	2.342***	3.549***
	(0.398)	(0.329)	(0.423)	(0.350)
Observations	1,939	3,942	6,160	6,730
R-squared	0.057	0.138	0.047	0.100

Notes: as for Table 3.

As presented in column (1) and column (2) in Table 6, in 2002 the positive correlation between happiness and general income inequality exists both in the migrants

group and the urban residents group. However, coefficients displayed in column (3) and column (4) reveal a sharp contrast. In 2007, the relationship between happiness and city-level Gini coefficients is no longer statistically significant for the migrants. Furthermore, income inequality (including both general inequality and between group inequality) is evidently hurting the subjective well-being of urban residents. A robustness check using only the seven common sampled cities is shown in Table 15 in the Appendix, where general inequality is negatively correlated with the happiness of both migrants and urban residents in 2007.

Table 7 Results of regressions on age groups (2002 & 2007)

Dependent Variable: Happiness Score			
	(1)	(2)	(3)
	The Young	The Middle-Aged	The Old
	Age≤30	30<Age≤50	Age>50
2002			
BI	-0.0448	-0.0699	-0.0695
	(0.0807)	(0.0426)	(0.0749)
Gini	2.019*	1.815***	1.343
	(1.209)	(0.537)	(0.882)
2007			
BI	0.0695	-0.185***	-0.127
	(0.0888)	(0.0705)	(0.0893)
Gini	2.578**	-2.166**	-4.474***
	(1.157)	(0.919)	(1.297)
	Age≤35	35<Age≤55	Age>55
2007			
BI	0.0252	-0.144*	-0.206**
	(0.0740)	(0.0742)	(0.104)
Gini	1.0790	-1.645*	-5.954***
	(0.974)	(0.981)	(1.508)

Notes:

1. Dependent variables: happiness scores based on cardinal values as follows: in 2002, "very happy" =4, "happy" =3, "so-so" =2; "not happy" =1, "not happy at all" =0; in 2007, "very happy" =4; "fairly happy" =3; "not very happy" =2; "not happy at all" =1.
2. All variables in the full equations of model (3) and model (5) in Table 3 are included in the estimation but only the coefficients of inequality indicators are presented.
3. Robust standard errors are in parentheses.
4. ***, ** and * denote statistical significance at 1%, 5% and 10% levels respectively.

Table 7 and Table 8 summarize the coefficients of inequality indicators (BI and city-level Gini) obtained from model (3) and model (5) in Table 3, using different age subsamples and income subsamples instead. Observations are divided into three age groups for both years. "Age≤30" represents the new comers into the labor market, "30<Age≤50" denotes the middle aged, and "Age>50" stands for the elder persons who are exiting the labor market. Another set of segmentation points (35 and 55 years

old) displays the results for the roughly same generation after the five years' time span. Coefficients in Table 7 bring out a remarkable contrast between 2002 and 2007. In 2002, both young people and the middle aged exhibit positive attitudes toward general inequality, with their happiness ratings positively correlate with city-level Gini coefficients. While in 2007, although general inequality still shows a positive impact on life satisfaction for the young, the negative effect is captured for the middle aged and the elderly. A robustness check using only the seven common sampled cities suggests similar trends and is shown in Table 16 in the Appendix.

Table 8 Results of regressions on income groups (2002 & 2007)

	(1)	(2)	(3)
VARIABLES	Lowest 30%	Middle 40%	Top 30%
2002			
BI	-0.121**	-0.0500	-0.00325
	(0.0560)	(0.0553)	(0.0625)
Gini	2.386***	1.534**	0.669
	(0.868)	(0.702)	(0.711)
2007			
BI	-0.237**	-0.0987	0.0349
	(0.116)	(0.0703)	(0.0767)
Gini	-2.339*	-0.504	-1.734
	(1.378)	(0.988)	(1.106)

Notes: as for Table 7.

Another interesting finding involves personal income levels. In Table 8, income groups are divided based on the lowest 30%, the middle 40% and the top 30% on the distribution of per capita household income. Regression results show that in 2002 the positive effect of general inequality is significant for the lowest 30% and the middle 40%. However, in 2007 this positive effect can no longer be observed. Income inequality even reduces the happiness of the lowest 30% significantly. The results using observations from the seven common cities are also similar (see Table 17 in the Appendix). General inequality no longer serves as a signal for future prosperity for the poorer people, but hurt their subjective well-being significantly.

Subsample analysis suggest an explanation for why city-level Gini turns to affect happiness negatively in 2007: unlike in 2002 when both migrants and urban residents showed their tolerance even gratification toward general inequality, by 2007 urban residents had lowered their tolerance and generally held a negative attitude about

income inequality. Besides, the middle aged and the elder residents had become averse to general inequality, so it was with the people on the bottom of the income distribution ladder.

4.4 Explanation with the Tunnel Effect

In former sections, this study adopts the view from previous literature that refer to the positive role of Gini in 2002 as the operation of "tunnel effect" (Knight and Gunatilaka 2010a; Jiang *et al.* 2012). In this part, the "tunnel effect" in 2002 is further confirmed by regressing with interaction terms between future income prospects and Gini coefficient. OLS regression results are shown in Table 9, with all interaction terms significant at 1% significance level. Table 9 indicates that the marginal effect of Gini is affected by expected income of the future. Having rising income expectation exerts positive partial effect on the role of Gini. If individuals are in downward income trajectories, the optimizing effect of general inequality would be reduced. [9]This finding is in line with Hirshman's "tunnel effect", which emphasizes the tolerance of inequality is generated from the the prospect of upward mobility.

For the analysis with CHIP 2007, however, this dataset doesn't provide the same question module for income expectation; there is no past income information neither. Yet the current income distributions provide some clues. As Hirschman and Rothschild (1973) argued, as long as the tunnel effect lasts, everybody feels better off, both those who have become richer and those who have not. It is therefore conceivable that one key feature of the tunnel effect is that it can generate optimism even for the current left-behind. Otherwise the poor would suffer more feelings of relative deprivation rather than good feelings such as hope. Thus as shown in Table 8, the positive sign of Gini coefficients for the poorest 30% in 2002 indicates the operation of tunnel effect, while the negative sign for the poorest 30% in 2007 suggest the worn out of the tunnel effect.

[9] A similar finding has been come up with by Ravallion and Lokshin (2000) in their study on Russia in the 1990s. They found that the support for governmental redistribution is higher amongst those who expect their welfare to fall, and rising expected welfare inhibits demand for redistribution. They also use the tunnel effect for explanation, whereby prospects of mobility (in both directions) influence the tolerance for inequality and thus the demand for governmental redistribution.

These empirical evidences indicate that the "tunnel effect" had once to be prevalent in urban China in the early 2000s, but tended to decay afterwards.

Table 9 The impact of income inequality on subjective-wellbeing, interaction terms included (2002)

Dependent Variable: Happiness Score	(1)
BI	-0.0612*
	(0.0323)
Gini	1.624***
	(0.406)
Urban *hukou*	-0.00981
	(0.0317)
Male	-0.0485**
	(0.0219)
Age	-0.0241***
	(0.00585)
Age-*squared*	0.000318***
	(5.99e-05)
Married	0.0812
	(0.0555)
Divorced	-0.257**
	(0.109)
Widowed	-0.186*
	(0.100)
Years of education	0.00401
	(0.00369)
Good health	0.207***
	(0.0252)
Bad health	-0.154***
	(0.0530)
Unemployment	-0.211***
	(0.0790)
Log household income per capita	0.303***
	(0.0189)
GDP per capita/10^4	-0.0498***
	(0.0191)
Population growth rate	-0.00539
	(0.0308)
Big city	0.0298
	(0.0292)
Central	-0.0330
	(0.0427)
Western	-0.0826
	(0.0531)
Expect rapid increase×Gini	1.020***
	(0.179)
Expect small increase×Gini	0.301***
	(0.0702)
Expect income decrease×Gini	-1.049***
	(0.104)
Constant	-0.302
	(0.224)
Observations	5,881
R-squared	0.143

Notes:

1. Dependent variables: happiness scores based on cardinal values as follows: "very happy" =4, "happy" =3, "so-so" =2; "not happy" =1, "not happy at all" =0.

2. Robust standard errors are in parentheses.
3. ***, ** and * denote statistical significance at 1%, 5% and 10% levels respectively.

5 Conclusion

This study analyzes the impact of income inequality on urban Chinese's subjective well-being in the 2000s, using two cross sectional datasets CHIP 2002 and CHIP 2007. Empirical results show that in 2002 general inequality (as measured by city-level Gini coefficients) positively associates with individual happiness. However, in 2007 general inequality turns to be a negative factor to reduce their subjective well-being. This remarkable contrast suggests that the tolerance for general inequality has been lowered among the urban Chinese population during the 2000s. Besides, identity-related inequality between urban residents and migrants is found to have negative impact on happiness in both years.

Empirical results suggest that compared with 2002, the "tunnel effect" is no longer prevalent in 2007 for the urban Chinese. As the poor and people who are in/above their middle age tend to regard general inequality as a negative factor of happiness, only the younger generation (Age$\leqslant$30) still exhibits some possibility to maintain the "tunnel effect".

The findings of this study provide noteworthy policy implications. Firstly, it warns the policy makers about the changing attitudes toward inequality in urban China. The discontent of previous income distribution would harm individuals' subjective well-being and give rise to social unrest. Secondly, it suggests the exhaustion of "tunnel effect" which would make future strategic planning more complex. "If growth and equity are considered the two principal economic tasks facing a country", as concluded by Hirschman and Rothschild (1973), "then these two tasks can be solved sequentially if the country is well supplied with the tunnel effect. If the tunnel effect is weak or nonexistent, then the two tasks will have to be solved simultaneously." As income inequality began to depress individual happiness, policy makers in China are suggested to try multiple ways to improve people's livelihood, alleviate disparities, and promote the economy to be more sustainable.

Appendix

Table 10 Definitions and descriptions of individual and household characteristics (2002)

Variable	Definitions	Full sample		Urban residents		Migrants		ANOVA
		5881		3942		1939		test
		Mean	*SD*	Mean	*SD*	Mean	*SD*	*p*-value
Happiness	Cardinal scores	2.450	0.844	2.490	0.858	2.369	0.809	0.000
Male	Male=1	0.482	0.499	0.421	0.494	0.605	0.489	0.000
Age		43.232	11.907	47.179	11.110	35.208	9.113	0.000
Marital status								
Married	Married=1	0.921	0.273	0.932	0.253	0.900	0.302	0.000
Divorced	Divorced=1	0.013	0.115	0.015	0.120	0.011	0.104	0.224
Widowed	Widowed=1	0.022	0.146	0.027	0.170	0.006	0.075	0.000
Years of education		10.010	3.331	11.000	3.118	8.005	2.810	0.000
Unemployed	Unemployed=1	0.023	0.148	0.027	0.162	0.014	0.117	0.002
Natural Log of Household annual income per capita		8.657	0.747	8.904	0.603	8.154	0.740	0.000
Health								
Good	Good health=1	0.697	0.460	0.594	0.491	0.906	0.292	0.000
Bad	Bad health=1	0.0517	0.221	0.068	0.251	0.019	0.137	0.000

Data source: CHIP 2002 and author's calculation

Note: p-value for ANOVA test, H_0: no difference between the mean value of the urban residents and that of migrants.

Table 11 Definitions and descriptions of individual and household characteristics (2007)

Variable	Definitions	Full sample		Urban residents		Migrants		ANOVA
		12890		6730		6160		test
		Mean	*SD*	Mean	*SD*	Mean	*SD*	*p*-value
Happiness	Cardinal scores	3.239	0.621	3.251	0.597	3.226	0.645	0.019
Male	Male=1	0.511	0.500	0.425	0.494	0.606	0.489	0.000
Age		40.034	14.827	48.218	13.649	31.067	10.166	0.000
Marital status								
Married	Married=1	0.753	0.431	0.887	0.317	0.607	0.488	0.000
Divorced	Divorced=1	0.018	0.132	0.025	0.153	0.110	0.104	0.000
Widowed	Widowed=1	0.021	0.142	0.035	0.185	0.004	0.066	0.000
Years of education		10.110	3.275	11.061	3.633	9.071	2.442	0.000
Unemployed	Unemployed=1	0.032	0.177	0.057	0.232	0.005	0.072	0.000
Natural Log of Household annual income per capita		9.641	0.605	9.718	0.653	9.556	0.535	0.000
Health								
Good	Good health=1	0.724	0.447	0.610	0.488	0.848	0.359	0.000
Bad	Bad health=1	0.036	0.187	0.057	0.231	0.014	0.119	0.000

Data source: CHIP 2007 and author's calculation

Note: p-value for ANOVA test, H_0: no difference between the mean value of the urban residents and that of migrants.

Table 12 City-level descriptive statistics (2002)

City	GDP per capita/10^4	Population growth rate (%)
Beijing	2.8449	1.247438
Taiyuan	1.358	2.197837
Datong	0.7186	1.664003
Shenyang	2.0316	-0.0609278
Dalian	2.5276	0.5986189
Jinzhou	0.7907	-0.016276
Wuxi	3.6151	0.6148199
Xuzhou	0.8763	0.2860754
Hefei	0.9274	1.343405
Wuhu	1.1109	0.6719332
Bozhou	0.3239	0.91
Zhengzhou	1.4414	1.593339
Kaifeng	0.5716	0.6694009
Pingdingshan	0.6584	0.6892686
Wuhan	1.9792	1.301716
Yichang	1.1174	-0.0603758
Xianning	0.5638	0.079245
Guangzhou	4.1884	1.125456
Zhanjiang	0.7539	0.921922
Zhaoqing	1.1549	0.4782721
Chongqing	0.6347	0.5138949
Chengdu	1.6277	0.8412589
Nanchong	0.3077	0.6763898
Kunming	1.4864	1.495323
Lanzhou	1.2588	1.49742
Fushan	0.5973	1.49742

Source: China City Statistical Yearbook 2003

Table 13 City-level descriptive statistics (2007)

City	GDP per capita/10^4	Population growth rate (%)
Shanghai	6.6367	2.36
Nanjing	5.3639	3.09
Wuxi	8.3923	2.6
Hangzhou	5.259	1.69
Ningbo	6.6067	2.67
Hefei	2.8134	2.9
Bengbu	1.2818	-0.31
Zhengzhou	3.4069	1.57
Luoyang	2.512	-0.29
Wuhan	3.5582	1.83
Guangzhou	7.1808	5.65
Shenzhen	7.9645	4.74
Dongguan	4.6027	4.57
Chongqing	1.466	0.28
Chengdu	2.6525	0.75

Source: China City Statistical Yearbook 2008

Table 14 The impact of income inequality on subjective-wellbeing, multilevel regressions (2002 & 2007)

Dependent Variable: Happiness Score	(1) 2002 Gini	(2) 2007 Gini	(3) 2007 Theil index	(4) 2007 Atkinson index
Level 1: Individual				
Urban *hukou*	-0.0747*	0.0275	0.0274	0.0275
	(0.0416)	(0.0273)	(0.0273)	(0.0273)
Male	-0.0354*	-0.0351***	-0.0352***	-0.0351***
	(0.0189)	(0.00844)	(0.00848)	(0.00846)
Age	-0.0342***	-0.0169***	-0.0169***	-0.0169***
	(0.00649)	(0.00268)	(0.00269)	(0.00267)
Age-*squared*	0.000413***	0.000189***	0.000188***	0.000188***
	(7.03e-05)	(2.50e-05)	(2.50e-05)	(2.49e-05)
Married	0.0947*	0.166***	0.166***	0.166***
	(0.0558)	(0.0220)	(0.0219)	(0.0219)
Divorced	-0.247**	-0.183***	-0.184***	-0.183***
	(0.100)	(0.0580)	(0.0579)	(0.0580)
Widowed	-0.167	-0.0591	-0.0587	-0.0586
	(0.105)	(0.0509)	(0.0507)	(0.0507)
Years of education	0.00534	0.0123***	0.0123***	0.0123***
	(0.00459)	(0.00228)	(0.00227)	(0.00227)
Good health	0.232***	0.233***	0.233***	0.233***
	(0.0246)	(0.0178)	(0.0179)	(0.0179)
Bad health	-0.168***	-0.199***	-0.198***	-0.199***
	(0.0335)	(0.0386)	(0.0388)	(0.0388)
Unemployment	-0.239**	-0.0632*	-0.0633*	-0.0636*
	(0.0949)	(0.0365)	(0.0364)	(0.0365)
Log household income per capita	0.334***	0.0796***	0.0797***	0.0798***
	(0.0182)	(0.0172)	(0.0172)	(0.0172)
Level-2: City				
BI	-0.0751	-0.0987	-0.0886	-0.106*
	(0.0766)	(0.0649)	(0.0555)	(0.0609)
Gini	2.184**	-1.009		
	(0.944)	(1.010)		
Theil			-0.705***	
			(0.261)	
Atkinson				-2.647**
				(1.085)
GDP per capita/10^4	-0.0474	-0.0203**	-0.0205**	-0.0242**
	(0.0534)	(0.00903)	(0.00846)	(0.00978)
Population growth rate	0.00958	0.00934	0.00862	0.0105
	(0.0626)	(0.0163)	(0.0145)	(0.0154)
Big city	0.0531	-0.0482	-0.0473	-0.0420
	(0.0630)	(0.0384)	(0.0297)	(0.0329)
Central	-0.00309	-0.0179	-0.00991	-0.00820
	(0.118)	(0.0553)	(0.0445)	(0.0482)
Western	-0.0928	0.0389	0.0858**	0.0596*
	(0.133)	(0.0354)	(0.0397)	(0.0351)
Constant	-0.535	2.953***	2.748***	2.877***
	(0.364)	(0.403)	(0.172)	(0.192)
Observations	5,881	12,890	12,890	12,890
Number of groups	26	15	15	15

Notes:

1. Dependent variables: happiness scores based on cardinal values as follows: in 2002, "very happy" =4, "happy" =3, "so-so" =2; "not happy" =1, "not happy at all" =0; in 2007, "very happy" =4; "fairly happy" =3; "not very happy" =2; "not happy at all" =1.
2. Robust standard errors are in parentheses.
3. ***, ** and * denote statistical significance at 1%, 5% and 10% levels respectively.

Table 15 Subsample analysis for migrants and urban residents, common cities (2002 & 2007)

Dependent Variable: Happiness Score	(1) Migrants 2002	(2) Urban Residents 2002	(3) Migrants 2007	(4) Urban Residents 2007
BI	-0.303***	-0.221***	-1.366***	0.359
	(0.0971)	(0.0842)	(0.349)	(0.281)
Gini	5.985***	2.141	-10.94***	-7.444***
	(1.663)	(1.356)	(2.310)	(1.869)
Urban *hukou*	-0.244	0.104	0.0237	0.0329
	(0.188)	(0.161)	(0.0948)	(0.0475)
Male	-0.0238	-0.0586	-0.0222	-0.0167
	(0.0529)	(0.0452)	(0.0223)	(0.0199)
Age	0.00879	-0.0384***	-0.0213***	-0.0211***
	(0.0227)	(0.0128)	(0.00780)	(0.00520)
Age-*squared*	-6.28e-05	0.000439***	0.000235**	0.000220***
	(0.000285)	(0.000125)	(0.000101)	(5.06e-05)
Married	0.157	0.0297	0.217***	0.0974*
	(0.127)	(0.121)	(0.0387)	(0.0534)
Divorced	-0.479	-0.349	-0.364***	-0.220**
	(0.564)	(0.228)	(0.138)	(0.0861)
Widowed	-0.368	-0.271	-0.00900	-0.142*
	(0.411)	(0.182)	(0.224)	(0.0856)
Years of education	0.0111	-0.0109	0.0233***	0.00863***
	(0.00974)	(0.00766)	(0.00528)	(0.00302)
Good health	0.0667	0.310***	0.241***	0.202***
	(0.107)	(0.0471)	(0.0369)	(0.0221)
Bad health	0.175	-0.189*	-0.319**	-0.160***
	(0.237)	(0.0975)	(0.129)	(0.0521)
Unemployment	-0.00586	-0.280*	0.157	-0.135***
	(0.192)	(0.157)	(0.129)	(0.0434)
Log household income per capita	0.198***	0.420***	-0.0103	0.139***
	(0.0384)	(0.0455)	(0.0225)	(0.0184)
GDP per capita/10^4	0.228**	0.0622	-0.352***	0.0409
	(0.103)	(0.0796)	(0.0671)	(0.0538)
Population growth rate	-0.266	0.169	0.302***	-0.0536
	(0.229)	(0.176)	(0.0475)	(0.0382)
Central	0.838**	0.263	-0.593**	0.424*
	(0.370)	(0.280)	(0.296)	(0.243)
Western	0.609**	0.466**	-0.883**	0.515*
	(0.282)	(0.230)	(0.366)	(0.303)
Constant	-2.038**	-1.524**	9.742***	3.650***
	(0.881)	(0.775)	(0.892)	(0.728)
Observations	748	1,345	3,219	3,444
R-squared	0.087	0.164	0.075	0.111

Notes:

1. Dependent variables: cardinal happiness scores in 2002 and 2007. In 2002, "very happy" =4, "happy" =3, "so-so" =2; "not happy" =1, "not happy at all" =0; in 2007, "very happy" =4; "fairly happy" =3; "not very happy" =2; "not happy at all" =1.
2. Observations are restricted to the seven common survey cities in CHIP 2002 and CHIP 2007. The seven cities are Wuxi, Hefei, Zhengzhou, Wuhan, Guangzhou, Chongqing, Chengdu, covering the eastern, central and western regions of China. Variable "Big City" is excluded to avoid collinearity with regional dummies.
3. Robust standard errors are in parentheses.
4. ***, ** and * denote statistical significance at 1%, 5% and 10% levels respectively.

Table 16 Results of regressions on age groups, common cities (2002 & 2007)

Dependent Variable: Happiness Score			
	(1)	(2)	(3)
	The Young	The Middle-Aged	The Old
	Age≤30	30<Age≤50	Age>50
2002			
BI	-0.282*	-0.201**	-0.295**
	(0.149)	(0.0845)	(0.132)
Gini	5.797**	3.778***	3.109
	(2.572)	(1.359)	(2.209)
2007			
BI	-1.608***	-.0523	0.398
	(0.435)	(0.329)	(0.420)
Gini	-4.694*	-10.943***	-9.923***
	(2.842)	(2.175)	(2.715)
	Age≤35	35<Age≤55	Age>55
2007			
BI	-1.0253***	0.0152	-0.202
	(0.361)	(0.347)	(0.513)
Gini	-6.210***	-10.375***	-10.284***
	(2.350)	(2.345)	(3.0989)

Notes:

1. Dependent variables: cardinal happiness scores in 2002 and 2007. In 2002, "very happy" =4, "happy" =3, "so-so" =2; "not happy" =1, "not happy at all" =0; in 2007, "very happy" =4; "fairly happy" =3; "not very happy" =2; "not happy at all" =1.
2. Observations are restricted to the seven common survey cities in CHIP 2002 and CHIP 2007. The seven cities are Wuxi, Hefei, Zhengzhou, Wuhan, Guangzhou, Chongqing, Chengdu, covering the eastern, central and western regions of China. Variable "Big City" is excluded to avoid collinearity with regional dummies.
3. Robust standard errors are in parentheses.
4. ***, ** and * denote statistical significance at 1%, 5% and 10% levels respectively.

Table 17 Results of regressions on income groups, common cities (2002 & 2007)

VARIABLES	(1) Lowest 30%	(2) Middle 40%	(3) Top 30%
2002			
BI	-0.267*	-0.241**	-0.355***
	(0.137)	(0.102)	(0.105)
Gini	4.187*	2.458	4.961***
	(2.272)	(1.667)	(1.720)
2007			
BI	-0.265	-0.777**	0.507
	(0.449)	(0.344)	(0.460)
Gini	-12.471***	-4.410*	-11.237***
	(2.414)	(2.374)	(3.533)

Notes:

1. Dependent variables: cardinal happiness scores in 2002 and 2007. In 2002, "very happy" =4, "happy" =3, "so-so" =2; "not happy" =1, "not happy at all" =0; in 2007, "very happy" =4; "fairly happy" =3; "not very happy" =2; "not happy at all" =1.
2. Observations are restricted to the seven common survey cities in CHIP 2002 and CHIP 2007. The seven cities are Wuxi, Hefei, Zhengzhou, Wuhan, Guangzhou, Chongqing, Chengdu, covering the eastern, central and western regions of China. Variable "Big City" is excluded to avoid collinearity with regional dummies.
3. Robust standard errors are in parentheses.
4. ***, ** and * denote statistical significance at 1%, 5% and 10% levels respectively.

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