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Happiness in China

Ma Yong and Chen Diandian

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Openness, Rural-Urban Inequality, and Happiness in China *

By MA YONG and CHEN DIANDIAN*

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Abstract

Although the relationship between income inequality and subjective wellbeing has been extensively discussed in the literature, relatively little is known about the effects of openness on subjective wellbeing and how rural-urban inequality may influence these effects. This article attempts to address this issue by using the dataset of China General Social Survey (CGSS). We find that the effect of trade openness on happiness is inverted U-shaped, whereas that of financial openness is U-shaped. We also find that rural-urban inequality exerts a dampening effect on happiness, and this effect is strengthened by trade openness but weakened by financial openness. These findings extend the previous studies on the determinants of happiness by highlighting the different effects associated with trade openness and financial openness and how such effects may interact with rural-urban inequality.

Keywords: Rural-Urban Inequality; Trade Openness; Financial Openness; Happiness

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* Ma Yong, Senior Research Fellow of IMI, School of Finance, Renmin University of China; Chen Diandian, School of Finance, Renmin University of China.

1. Introduction

Since the end of World War II, globalization is arguably one of the most prominent trends across the world. In this backdrop, Asian countries have adopted economic and financial opening policies to promote economic growth and people's welfare. Theoretically, the welfare effect of trade opening lies in that increased imports help to alleviate income inequality. Researchers find that tradable commodities account for a high proportion of low-income household expenditures. The implementation of trade opening has lowered the prices of these commodities, thereby reducing the expenditures and increasing the welfare of low-income families (Carroll and Hur, 2020). Also, trade opening increased employment opportunities in the export sector, resulting in the rise of labor force participation rates (Madanizadeh and Pilvar, 2019).

As for the welfare effects associated with financial opening, there are studies arguing that backward areas can narrow urban-rural income gap by making use of FDI to develop tourism and other characteristic industries for poverty alleviation (Kim and Kang, 2020). It also generates welfare gains in the sense that advanced technologies brought by foreign investments would have spillover effects, fostering the economic development of developing countries (Ma et al., 2019). Moreover, opening domestic trade and financial markets can enrich the choices of commodities and lifestyles as cross-border flows of goods, services, and finance become increasingly convenient. All these improvements in economic freedom and efficiency would contribute to improving individual welfare (Rahman and Veenhoven, 2018).

From an empirical perspective, there are evidences showing that openness has a positive effect on subjective wellbeing. For example, Khun et al. (2015) find that people in countries with less trade restrictions report higher degrees of life satisfaction. Tsai (2009) provides evidence that subjective wellbeing improves during the transition from a closed economy to an open one. However, there are also studies suggesting that openness may not necessarily enhance happiness. For example, despite overwhelming studies arguing that openness promotes economic growth (e.g., Chang et al., 2009; Darku and Yeboah, 2018), it remains largely inconclusive whether economic growth would enhance people's subjective wellbeing. According to the classic Easterlin paradox, although economic growth and increased income can boost up happiness to some extent, the effects typically dilute across nations and periods (Easterlin, 1974). As documented by Bartolini and Sarracino (2015), in the ten years around 2000, despite substantial growth in the economy, China reports a decline in subjective wellbeing. Such frustration is contrary to the intuition that increased absolute income would bring happiness. In this regard, the so-called "China puzzle" is supportive of the Easterlin paradox. To account for the "China puzzle", Knight et al. (2009) turn to focus on the role of income inequality instead of absolute income and propose that relative deprivation caused by income gap, rather than poverty, capture the variations of happiness within a country.

In fact, the effects of openness on poverty and inequality are highly controversial. Opening policies that lower consumer and investment tariffs would produce a

redistributive effect of income (Turnovsky and Rojas-Vallejos, 2018), which will aggravate job polarization (Lee, 2020). In particular, financial openness usually leads to reductions in costs of financing activities, from which the upper-income group would actually gain more benefits (Erauskin and Turnovsky, 2019). This is because financing activities such as overseas investment and borrowing are more connected to the life of the rich people. Nonetheless, meta-analysis indicates that the previous literature generally supports a small negative correlation between financial openness and income inequality (Ni and Liu, 2019).

In recent years, the explosive growth of data has enriched the studies on Chinese happiness. For example, Wen et al. (2019) notice that in the family of the rural-to-urban migrant workers, grandparents have to raise grandchildren in rural areas. They investigated whether living in such a skipped-generation family dampens the happiness of the elder people and provided inconclusive evidences. Morgan and Wang (2018) use a modified Oaxaca decomposition method and find that improving labor market conditions are the main contributor to life satisfactions of the urban Chinese over the period of 2002-2012. In the study of Han and Gao (2019), participation in welfare programs such as the lowest insurance in rural areas can improve the life satisfaction of recipients. Other determinants of subjective wellbeing in China include quality of government, distributive justice beliefs as well as societal values (Huang, 2019; Lim et al., 2020; Liu et al., 2020)

It is worth noting that, despite the vast literature on happiness, very little is known about how openness may affect happiness, because the opening policy is typically not regarded as a direct cause of happiness traditionally. However, as China is more deeply integrated into globalization, the Chinese people become wealthier, and materialism gets popular (Bartolini and Sarracino, 2015). In this backdrop, the economic results of the opening policy tend to play an important role in determining happiness. Moreover, it is observed that the incomes of different social classes are widely divided in the process of economic development, which suggests that the “inequality channel” is very likely to exist. Taken together, as openness can affect happiness through both the wealth channel and the inequality channel, how these two channels may interact with others becomes an interesting question that needs to be studied.

Another issue that is not adequately addressed in the previous literature is the distinction between different dimensions of openness and its implications for the openness-happiness nexus. Recent studies suggest that economic (trade) openness and financial openness may have different effects on the economy and society. For example, economic (trade) openness can stimulate the massive production of domestic products and thereby promote economic growth (Ma et al., 2014), especially in developing countries (Semancíková, 2016; Tahir and Azid, 2015). But this conclusion does not necessarily hold for the effects of financial openness. Indeed, financial openness is found to be associated with higher financial risks (Ashraf, 2017), which are harmful to financial development and may result in a negative impact on

economic growth (Bremus and Buch, 2016; Guillen, 2016). In this regard, another focus of this paper is to investigate the potentially different effects that are associated with different dimensions of openness. To be specific, we distinguish between two important aspects of openness (i.e., economic openness and financial openness) in this paper and discuss the potential differences that exist in their relationships with happiness.

To sum up, although there is an extensive literature on the various determinants of people's subjective wellbeing, little is known about how financial and trade openness may affect people's subjective wellbeing. In this paper, we attempt to address this inadequacy, although tentatively, using data from a national survey in China. We find interesting and enlightening results, which are not well understood in the previous literature and will be discussed in detail in the main text. Also, to the best of our knowledge, this is the first paper to study how financial and trade openness may affect people's subjective wellbeing in China. Therefore, the analysis of the paper also complements the emerging literature on the various determinants of subjective wellbeing in China.

The rest of the paper is organized as follows. Section 2 presents the data and methodology. Section 3 reports baseline empirical results and discusses their implications. Section 4 extends the analysis by examining cohort differences. Section 5 concludes the paper.

2. Data and Empirical Strategy

2.1 Data and variables

The raw data in this paper are collected from multiple data sources. The dataset of China General Social Survey (CGSS) is used as the source of individual information. Starting in 2003, CGSS is conducted annually (or bi-annually) by Renmin University of China and Hong Kong University of Science and Technology, and has been widely used in many fields of social studies. In order to maintain consistency, we use the last four waves of the CGSS data (because the sampling approach for the previous waves of the survey is different). We then obtain a sample of 51,574 respondents aged over 17 years, from 31 provinces (Hong Kong, Macao and Taiwan are not included due to data availability). The proportion of urban and rural samples is approximately 6:4. After dropping 6843 missing values, the final sample for empirical analysis has 44,731 observations. Table 1 presents the year-wise sample distribution. To ensure that there is no bias from abandoned observations, Table 2 exhibits the distributions of happiness. Trivial statistical differences exist between the full sample and the final sample, indicating little danger from sample bias.

Table 1
Year-wise sample distribution.

	2010	2011	2012	2013	2015	Total
Number of respondents	10,216	4871	10,250	9734	9660	44,731
Average happiness	3.77	3.91	3.83	3.77	3.88	3.82

Table 2
Distribution of happiness in the full sample and the final sample.

Happiness	Full sample		Final sample	
	Frequency	Percent (%)	Frequency	Percent (%)
Very unhappy	857	1.66	728	1.63
Relatively unhappy	3677	7.13	3108	6.95
Neither unhappy nor happy	8322	16.14	7039	15.74
Relatively happy	30,158	58.48	26,429	59.08
Very happy	8424	16.33	7427	16.60
Missing	136	0.26	-	-
Total	51,574	100	44,731	100

The data for provincial variables, including GDP, per capita disposable income, export, import and foreign direct investment (FDI), which are used to construct proxy variables for trade openness, financial openness, and rural-urban inequality, are obtained from the National Bureau Statistics of China and Provincial Statistical Yearbooks. Data for the various regional control variables such as CPI, industrial production, and government expenditure are also extracted from the same source.

2.1.1 Measure of happiness

In line with the previous studies, happiness in this paper is measured by interviewees' answers to the following multiple-choice question: "Generally speaking, how do you think about your life?" Except for cases of inapplicability, inability to answer and refusal to answer, options are set in a Likert-scale type, i.e., "very unhappy", "relatively unhappy", "neither unhappy nor happy", "relatively happy" and "very happy". For our analysis, we code the responses from 1 to 5 in order, where 1 represents "very unhappy" and 5 stands for "very happy". As suggested by Ferrer-i-Carbonell and Ramos (2014), this measure of subjective wellbeing is of the most common usage and of sufficient reliability. The average happiness of interviewees in the final sample scores 3.821 out of 5, situated between "neither unhappy nor happy" and "relatively happy". Figure 1 displays the year-wise sample distribution of happiness of the final sample in percentage. The distribution shows a consistent pattern with the previous literature (e.g., Jiang et al., 2012; Knight and Guantilaka, 2010), which further confirms the validity of data.

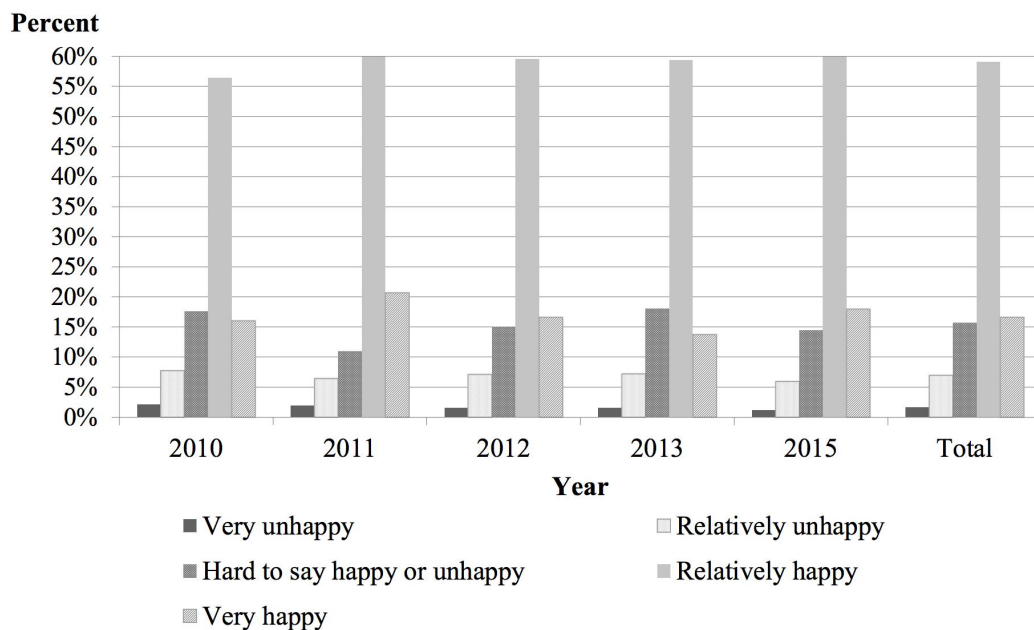


Fig. 1 Distribution of happiness in China: 2010-2015

2.1.2 Measures of openness and rural-urban Inequality

The core explanatory variables used in this paper include openness and inequality as well as their square terms and interaction terms. The square terms are included to investigate the potential non-linear relationships while the interaction terms are included to examine whether there are strengthening or weakening effects of openness on inequality.

As explained earlier, in order to detect the potentially different effects associated with different dimensions of openness, we use two measures of openness: trade openness and financial openness. Consistent with prior literature (e.g., Zhang et al., 2015), we measure trade openness (TO) by calculating the total trade volume of import and export as a fraction of GDP in the region¹. In order to measure financial openness (FO) more accurately, several measures are considered here. Lane and Milesi-Ferretti (2007) recommend using the de facto measure, which defines financial openness as a fraction of total capital flow to GDP. Alternatively, Chinn and Ito (2006) propose the de jure measure, which quantifies financial openness as a dummy indicating limitations on cross-border financial activities. Although the de jure measure has a solid theoretical basis, the de facto measure has a better econometric property. To avoid endogeneity, and also because of data availability, we use the de facto measure, i.e., financial openness in this paper is measured by the proportion of foreign direct investment (FDI) in GDP for each region.

Besides methodology and data issues, a political issue on the measure is whether provincial governments in China are authorized to make regional trade and financial

¹ Dollar-denominated foreign trade volumes and foreign direct investment amounts are converted into Renminbi at the prevailing exchange rate that year.

policies. Generally, foreign trade and investment policies are formulated by the central government in China. Nonetheless, local governments still have certain administrative powers in deciding trade and financial opening policies. For example, local governments may, in respective of the actual situations in the region, draft local laws and regulations, and organize their implementation. In deciding openness, local governments are responsible for the management of licenses and quotas for import and export commodities, as well as approvals (with limited authorities) and filings for the establishment of foreign-invested enterprises. Furthermore, supporting measures for funds and services, such as loans to foreign-invested enterprises, environmental standards for production, and convenience of export rebates, are all under local jurisdiction. Hence, local governments can influence the degree of openness by changing regional policies as well as the related administrative procedures. For example, in response to the economic impact of COVID-19, the Shanghai Municipal Commission of Commerce issued 11 policies to support foreign trade, including the exemption of tariffs for epidemic prevention and control materials, reduction of guarantee fees for financing, among other measures.

Following the literature on income inequality (e.g., Lu and Chen, 2006; Morgan and Wang, 2018), we adopt the income ratio of urban residents to that of rural residents as the measure of rural-urban inequality. The ratio is calculated as the per capita disposable income of urban residents divided by the per capita disposable income of rural residents. According to the location where the respondents dwelled, we group individuals within the same province to generate the inequality indicators. Due to data availability, we employ indicators estimated at the provincial level rather than at a lower level. Alternative measures will be discussed in the robustness analysis. As mentioned earlier, we also include the interaction terms between measures of inequality and openness to investigate whether there is a channel that openness can have an additional impact on the effect of inequality on happiness.

2.1.3 Other control variables

Besides the main variables of interest mentioned above, in line with the previous literature (e.g., Han and Gao, 2019; Huang, 2019; Morgan and Wang, 2018; Tran et al., 2018; Wen et al., 2019; Yang et al., 2019; Zhang and Churchill, 2020), we also include a set of individual characteristics that may affect happiness. Specifically, we control for age, income level, gender, ethnicity, education, political status, religious belief, marital status, health, and social status in our regressions. In addition, it is worth noting that the measure of openness might be biased by other provincial variables. For instance, higher trade to GDP ratio may be due to that some Chinese provinces are industrial hubs. If so, the cross-province comparison would be misleading. There is also a possibility that average area-level income helps mitigate the negative relationship between inequality and subjective welfare (Tran et al., 2018). To address these concerns, we also control for various province-level variables, including GDP per capita, provincial GDP as a percentage of total national GDP,

industrial production, CPI, and government expenditure. Year dummies are included in regressions to capture time effects. Detailed definitions of the variables are presented in Table 3. Table 4 reports descriptive statistics of the data.

Table 3 Definitions of variables

Variable	Description
<i>Happiness</i>	Self-reported happiness level. Very happy=5; relatively happy=4; neither unhappy nor happy=3; relatively unhappy=2; very unhappy=1
<i>Trade openness</i>	Total volume of foreign trade in the province/Provincial GDP
<i>Financial openness</i>	Foreign direct investment (FDI) in the province/Provincial GDP (in %)
<i>Inequality</i>	Per capita disposable income of urban residents/per capita disposable income of rural residents in the province where the respondent is interviewed
<i>Age</i>	Age of the respondent (in years)
<i>Income</i>	Natural logarithm of the respondent's household income in the previous year of being investigated
<i>Gender</i>	Gender of the respondent. If male, then Gender=1; if female, then Gender=0
<i>Ethnicity</i>	Ethnicity of the respondent. If Han, then Ethnicity=1; if minority, then Ethnicity=0
<i>Education</i>	Educational background of the respondent. Bachelor degree and above=5; post-secondary education=4; senior middle school or secondary vocational school education=3; junior high school education=2; primary education=1; no formal education=0
<i>Political status</i>	Political status of the respondent. If member of Chinese Communist Party (CCP), then Political status=1; otherwise Political status=0 (including member of Communist Youth League, member of democratic parties, and none)
<i>Religion</i>	Religious affiliation of the respondent. If religion follower, then Religion=1; if no religious affiliation, then Religion=0
<i>Divorced</i>	Marital status of the respondent. If divorced or separated, then Divorced=1; otherwise Divorced=0
<i>Married</i>	Marital status of the respondent. If married, then Married=1; otherwise Married=0
<i>Health</i>	Physical condition of the respondent. In good health=5; relatively healthy=4; so-so=3; relatively unhealthy=2; in poor health=1
<i>Status change</i>	Socioeconomic status change compared with previous period. Higher=2; unchanged=1; lower=0
<i>GDP per capita</i>	Natural logarithm of real GDP per capita in the province

	where the respondent is interviewed (in yuan)
<i>GDP proportion</i>	Provincial GDP as a proportion of total national GDP
<i>CPI</i>	The rate of change in Consumer price index in the province where the respondent is interviewed (in %)
<i>Industrial production</i>	Natural logarithm of industrial added value in the province where the respondent is interviewed (in 100 million yuan)
<i>Government expenditure</i>	Provincial government expenditure as a fraction of provincial GDP

Table 4 Descriptive statistics of the data (N=44,731)

Variable	Mean or %	Std. Dev.	Minimum	Maximum
<i>Dependent variable</i>				
Happiness	3.821	0.846	1	5
Very happy	1.6			
Relatively happy	6.9			
Neither unhappy nor happy	15.7			
Relatively unhappy	59.1			
Very unhappy	16.6			
<i>Explanatory variables</i>				
Trade openness	0.303	0.326	0.015	1.457
Financial openness	2.428	1.679	0.068	7.961
Inequality	2.703	0.481	1.845	4.073
<i>Individual characteristics</i>				
Age	48.772	15.908	17	97
Income	10.311	1.091	4.605	13.816
Gender	0.495	0.5	0	1
Ethnicity	0.919	0.273	0	1
Education	2.064	1.348	0	5
No formal education	12.6			
Primary education	23.6			
Junior high school education	29.7			
Senior middle school or secondary vocational school education	18.8			
Post-secondary education	9.8			
Bachelor degree and above	5.6			
Political status	0.116	0.321	0	1
Religion	0.119	0.324	0	1
Divorced	0.021	0.143	0	1
Married	0.806	0.396	0	1
Health	3.536	1.127	1	5
In poor health	4.2			
Relatively unhealthy	16.8			
So-so	22.1			
Relatively healthy	35.3			
In good health	21.7			
Status change	1.384	0.678	0	2
Lower	11.2			
Unchanged	39.2			
Higher	49.6			
<i>Regional variables</i>				

GDP per capita	10.590	0.460	9.482	11.590
GDP proportion	0.037	0.026	0.001	0.112
CPI	0.031	0.013	0.006	0.061
Industrial production	8.687	0.973	3.682	10.318
Government expenditure	0.236	0.124	0.106	1.086

2.2 Estimation methodology

Following recent studies on happiness (e.g. Tran et al., 2018; Wen et al., 2019), we specify the following regression model to estimate the effects of trade openness, financial openness, and rural-urban income inequality on happiness:

$$Happiness_{ij} = \alpha + \beta_1 TO_j + \beta_2 TO_j^2 + \beta_3 FO_j + \beta_4 FO_j^2 + \beta_5 Ineq_j + \beta_6 Ineq_j \times TO_j + \beta_7 Ineq_j \times FO_j + \beta_8 X_{ij} + \varepsilon_{ij} \quad (1)$$

where i and j denote subscripts for individuals and provinces, respectively.

$Happiness_{ij}$ denotes the self-reported happiness; TO_j and FO_j denote trade openness and financial openness, respectively. $Ineq_j$ denotes the rural-urban income gap. X_{ij} is the vector of control variables and year dummies. ε_{ij} is the error term.

Concerning the estimation method, conventional econometrics treats the dependent variable *Happiness* as an ordinal variable and thus uses ordered response models. However, Ferrer-i-Carbonell and Frijters (2004) argue that it does not matter to the result whether happiness is treated as cardinal or ordinal. In line with the standard practice in the literature (e.g., Jiang et al., 2012; Yang et al., 2019), we use the ordered probit (Oprobit) model in the main analysis. Additionally, the results of ordered logit (Ologit) model and OLS are also reported in the robustness checks.

3. Empirical Results

3.1 Baseline results

Table 5 reports the estimation results of Equation (1). From the results in Table 5, we can see that for all model specifications and estimation methods, the coefficient on the level term of happiness is significantly positive while that on the square term is significantly negative, suggesting that there is an inverted U-shaped relationship between trade openness and happiness. Taking the results estimated by the Oprobit model for illustration, the threshold value of trade openness occurs approximately at 2 in the regression without control variables and at 1.67 in the regression with full control variables, ceteris paribus. This means that living in a region with increasing trade openness can improve the happiness of dwellers until trade openness reaches a specific threshold value, which locates between 1.67 and 2 for our sample. After that, life satisfaction will decrease as the degree of trade openness further increases.

However, no region has a trade openness higher than 1.46 in the sample. Thus, people in almost all regions in China can still gain more happiness by promoting the trade openness of the regions where they live.

In contrast to the inverted U-shaped relationship between trade openness and happiness, the impact of financial openness on happiness forms a U-shaped pattern, as suggested by the negatively significant coefficient on the level term of financial openness and the positively significant coefficient on its square term. In other words, the effect of financial openness on happiness is negative before financial openness reaches a critical threshold value and then becomes positive after the threshold value. As far as our sample is concerned, the associated threshold value of financial openness occurs approximately at 10.68% in the regression without controls and 11.2% in the regression with full controls. After that, people's happiness will improve as the degree of financial openness increases. However, none of the sample regions have reached a degree of financial openness higher than 7.96%, indicating that China is now still in a stage that financial opening has a dampening effect on people's happiness.

As for the effect of rural-urban inequality on happiness, consistent with the previous literature (e.g., Huang et al., 2016; Jiang et al., 2012), the coefficient on inequality is negative and statistically significant, suggesting that people's happiness would decrease as income disparity increases. Meanwhile, the coefficient on the interaction term between inequality and trade openness (β_6) is estimated to be significantly negative, implying an exacerbating effect of trade openness on the negative effect of inequality on happiness. To be more specific, in a region with a higher degree of trade openness, relative deprivation from rural-urban inequality tends to be more substantial, resulting in a lower level of happiness for people in these regions. In other words, although trade openness itself can raise happiness, its positive effect would be discounted by decreasing the slope of inequality and happiness. This is also consistent with the results in Yang and Greaney (2016), who find that trade openness alleviated inequality in the US and Japan but worsened inequality in China. By comparison, the coefficient on the interaction term between the rural-urban gap and financial openness (β_7) is estimated to be significantly positive, suggesting that financial openness can moderate the negative impact of inequality on happiness. The implication is that in a region with higher financial openness, the feeling of relative deprivation is weaker and people tend to be happier because of less aversion to income inequality.

Overall, the results obtained with different estimation methods are highly consistent, which confirms the validity of our main findings. Trivial differences are found in the magnitude of the estimates: of the three models, Ologit generates the largest values, followed by Oprobit, and OLS the smallest. As for model specification, it can be

easily seen that, the estimates without control variables are slightly overestimated, implying necessity for inclusion of the control variables.

Table 5 Baseline results

Dependent variable:	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Happiness	Oprobit	Ologit	OLS	Oprobit	Ologit	OLS
	without control variables	without control variables	without control variables	with control variables	with control variables	with control variables
Trade openness	2.028** *	3.651** *	1.449** *	0.607** *	1.000** *	0.396** *
	(0.18)	(0.31)	(0.14)	(0.22)	(0.38)	(0.15)
Trade openness squared	-0.506** *	-0.880** *	-0.382** *	-0.182** *	-0.317** *	-0.114** *
	(0.04)	(0.08)	(0.03)	(0.06)	(0.11)	(0.05)
Financial openness	-0.363** *	-0.651** *	-0.250** *	-0.336** *	-0.607** *	-0.221** *
	(0.04)	(0.07)	(0.03)	(0.04)	(0.07)	(0.03)
Financial openness squared	0.017** *	0.031** *	0.011** *	0.015** *	0.027** *	0.010** *
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Inequality	-0.118** *	-0.203** *	-0.093** *	-0.102** *	-0.190** *	-0.069** *
	(0.02)	(0.04)	(0.02)	(0.03)	(0.05)	(0.02)
Inequality × Trade openness	-0.482** *	-0.894** *	-0.333** *	-0.223** *	-0.386** *	-0.151** *
	(0.06)	(0.11)	(0.05)	(0.07)	(0.13)	(0.05)
Inequality × Financial openness	0.077** *	0.133** *	0.056** *	0.068** *	0.123** *	0.047** *
	(6.54)	(6.37)	(6.13)	(5.54)	(5.64)	(5.32)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
LR statistic	540.75**	569.90**		5082.72***	5168.87***	
Pseudo R-squared	0.01	0.01		0.06	0.06	
Number of observations	44731	44731	44731	44731	44731	44731

Notes: (1) Robust standard errors are in parentheses; (2) *, **, *** indicate statistically significant at the 10%, 5% and 1% level respectively.

Regarding the effects of control variables, almost all of them are estimated to be statistically significant. This means that our selection of controls is generally valid. For better interpretation, Table 6 quantifies the baseline results by reporting the

average marginal effect of explanatory variables.² Because the dependent variable takes all levels of happiness into account, the average marginal effect estimations yield five sets of results accordingly. As the predicted outcome shifts from unhappiness to happiness, the effects of the variables of being male, not minority, and divorced shift from positive to negative. In contrast, the marginal effects of the variables of higher income, higher education, being a CCP member, having religious belief, being married, in good health status, and higher social status, shifts the other way around.

As for the specific effects associated with the controls, our results are generally consistent with the prior studies (e.g., Han and Gao, 2019; Huang, 2019; Morgan and Wang, 2018; Tran et al., 2018; Yang et al., 2019; Zhang and Churchill, 2020). For example, the result supports a U-shaped age-happiness curve with the lowest point at about 40 years old, for middle-aged people suffer from economic pressure and career ceilings. A 1% increase in average income may increase the marginal probability of happiness by 0.033. It is also suggested that females are more likely to be happy than males (with a higher marginal probability of 0.024). Not surprisingly, minorities enjoy more happiness because of the preferential ethnic policies. Enhancement in happiness can also be achieved by receiving a higher level of education, being a member of the China Communist Party, or a nonbeliever. Marital, health and social status turn out to be the first three critical determinants of happiness among all the individual control variables, which can raise the marginal probability of happiness by 0.050, 0.047, and 0.034, respectively. Concerning the provincial variables, positive coefficients of GDP per capita, industrial production, and government expenditure indicate that improvement in the economic conditions of the province in which respondents live can improve individual wellbeing. Nonetheless, GDP proportion generates a negative impact on happiness when controlling for absolute GDP, indicating that dwellers in highly developed provinces may suffer from high pressures in life while enjoying better economic conditions. Finally, the marginal probability of CPI amounts to -1.438, suggesting that inflation exerts a strong negative influence on happiness, as was evidenced by Tsai (2009).

Table 6 Average marginal effects

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:		ME	ME	ME	ME	ME
Happiness	Oprobit	(Happine ss=1)	(Happine ss=2)	(Happine ss=3)	(Happine ss=4)	(Happine ss=5)
<i>Impacts of openness and inequality</i>						
Trade openness	0.60 7*** (0.22)	0.004 (0.00)	0.013 (0.01)	0.018 (0.01)	-0.013 (0.01)	-0.021 (0.01)

² Due to the existence of the square term and interaction term, the marginal effects of core variables are hardly distinguishable from the change of themselves. Hence, we leave the discussion on the marginal effect of openness and inequality to the next section and simply focus on the control variables here.

Trade openness squared	)	-0.182*					
)	**					
	)	(0.06					
Financial openness	)	-0.336***	0.003***	0.010***	0.013***	-0.010**	-0.016**
)	*				*	*
	)	(0.04	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Financial openness squared	)	0.015***					
	)	(0.00					
Inequality	)	-0.102***	0.000	0.001	0.001	-0.001	-0.001
	)	(0.03	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Inequality × Trade openness	)	-0.223**					
)	**					
	)	(0.07					
Inequality × Financial openness	)	0.068***					
	)	(0.01					
<i>Individual characteristics</i>							
Age	)	-0.036***	-0.003***	-0.011**	-0.015**	0.012***	0.018***
)	*		*	*		
	)	(0.00	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Age squared/100	)	0.046***					
	)	(0.00					
Income	)	0.163***	-0.006***	-0.020**	-0.028**	0.021***	0.033***
)	*		*	*		
	)	(0.01	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)	
	Opro	ME	ME	ME	ME	ME	ME

Happiness	bit	(Happines s=1)	(Happines s=2)	(Happines s=3)	(Happines s=4)	(Happines s=5)
Gender	-0.117*** (0.01)	0.004*** (0.00)	0.014*** (0.00)	0.020*** (0.00)	-0.015*** (0.00)	-0.024*** (0.00)
Ethnicity	-0.081*** (0.02)	0.003*** (0.00)	0.010*** (0.00)	0.014*** (0.00)	-0.010*** (0.00)	-0.016*** (0.00)
Education	0.024*** (0.01)	-0.001*** (0.00)	-0.003*** (0.00)	-0.004*** (0.00)	0.003*** (0.00)	0.005*** (0.00)
Political status	0.148*** (0.02)	-0.005*** (0.00)	-0.018*** (0.00)	-0.025*** (0.00)	0.019*** (0.00)	0.030*** (0.00)
Religion	0.113*** (0.02)	-0.004*** (0.00)	-0.014*** (0.00)	-0.019*** (0.00)	0.014*** (0.00)	0.023*** (0.00)
Divorced	-0.221*** (0.04)	0.008*** (0.00)	0.027*** (0.00)	0.038*** (0.01)	-0.028*** (0.01)	-0.044*** (0.01)
Married	0.249*** (0.02)	-0.009*** (0.00)	-0.031*** (0.00)	-0.042*** (0.00)	0.032*** (0.00)	0.050*** (0.00)
Health	0.234*** (0.01)	-0.008*** (0.00)	-0.029*** (0.00)	-0.040*** (0.00)	0.030*** (0.00)	0.047*** (0.00)
Status	0.167*** (0.01)	-0.006*** (0.00)	-0.021*** (0.00)	-0.029*** (0.00)	0.021*** (0.00)	0.034*** (0.00)
<i>Regional controls</i>						
GDP per capita	0.249*** (0.04)	-0.009*** (0.00)	-0.031*** (0.00)	-0.042*** (0.01)	0.032*** (0.00)	0.050*** (0.01)

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)
Happiness	Oprobit	ME (Happines s=1)	ME (Happines s=2)	ME (Happines s=3)	ME (Happines s=4)	ME (Happines s=5)
GDP proportion	-1.402* (0.72)	0.048** (0.02)	0.173** (0.09)	0.239* (0.12)	-0.179** (0.09)	-0.281* (0.15)

CPI	-7.169*** (1.58)	0.247*** (0.05)	0.885*** (0.19)	1.222*** (0.27)	-0.917*** (0.20)	-1.438*** (0.32)
Industrial production	0.123*** (0.03)	-0.004*** (0.00)	-0.015*** (0.00)	-0.021*** (0.01)	0.016*** (0.00)	0.025*** (0.01)
Government expenditure	1.140*** (0.23)	-0.039*** (0.01)	-0.141*** (0.03)	-0.194*** (0.04)	0.146*** (0.03)	0.229*** (0.05)
Year	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	4473 1	44731	44731	44731	44731	44731

Notes: (1) Robust standard errors are in parentheses; (2) *, **, *** indicate statistically significant at the 10%, 5% and 1% level respectively.

3.2 Marginal analysis

In order to intuitively illustrate the interplay of openness and inequality on residents' wellbeing, we adopt a graphical approach by following Ashraf et al. (2020) for further marginal analysis. To this end, we convert the continuous variables into discrete ones. Specifically, to distinguish between regions with high and low financial openness, we introduce a dummy variable $TOdum$, which takes the value of one if trade openness is greater than the sample mean and zero otherwise. Similarly, the dummy $FOdum$ distinguishes regions with high and low financial openness, and $Ineqdum$ distinguishes regions with high and low rural-urban inequality. Then Equation (1) becomes:

$$Happiness_{ij} = \alpha + \beta_1 TOdum_j + \beta_3 FOdum_j + \beta_5 Ineqdum_j + \beta_6 Ineqdum_j \times TOdum_j + \beta_7 Ineqdum_j \times FOdum_j + \beta_9 X_{ij} + \varepsilon_{ij} \quad \backslash * MERGEFORMAT$$

The marginal effects of trade and financial openness are respectively given by:

$$\frac{\partial Happiness_{ij}}{\partial TOdum_j} = \beta_1 + \beta_6 Ineqdum_j, \quad \frac{\partial Happiness_{ij}}{\partial FOdum_j} = \beta_3 + \beta_7 Ineqdum_j$$

It is obvious that inequality affects the impact of trade and financial openness by β_6 and β_7 respectively. Meanwhile, the marginal effect of inequality is also affected by trade and financial openness:

$$\frac{\partial Happiness_{ij}}{\partial Ineqdum_j} = \beta_5 + \beta_6 TOdum_j + \beta_7 FOdum_j$$

Based on the estimation results for Equation (2), Figures 2 and 3 display the marginal effects of different levels of openness on the wellbeing of residents living in areas with low (i.e., $Ineqdum=0$) and high (i.e., $Ineqdum=1$) inequality respectively. According to horizontal comparison of Figure 2, the marginal probability of happiness is higher in regions with higher degrees of trade openness than that with lower degrees of trade openness. This suggests that trade openness has an affirmative impact on happiness, as estimated before. By vertical comparison, the marginal effect of trade openness is more pronounced in regions with higher inequality than those in regions with lower inequality, indicating that inequality strengthens the positive impact of trade openness. In addition, this strengthening effect becomes stronger as the degree of trade openness increases, as shown by the enlarging gap between two lines.

As for financial openness (see Figure 3), people in regions with a higher degree of financial openness tend to have a lower marginal probability of happiness, which again confirms the previous baseline results. By within-group comparison, highly unequal regions show greater marginal effects of financial openness than regions with lower inequalities, implying a moderation effect of inequality that weakens the negative impact of financial openness. Additionally, this moderation effect is attenuated given a rise to financial openness, as shown by the decreasing disparity between lines.

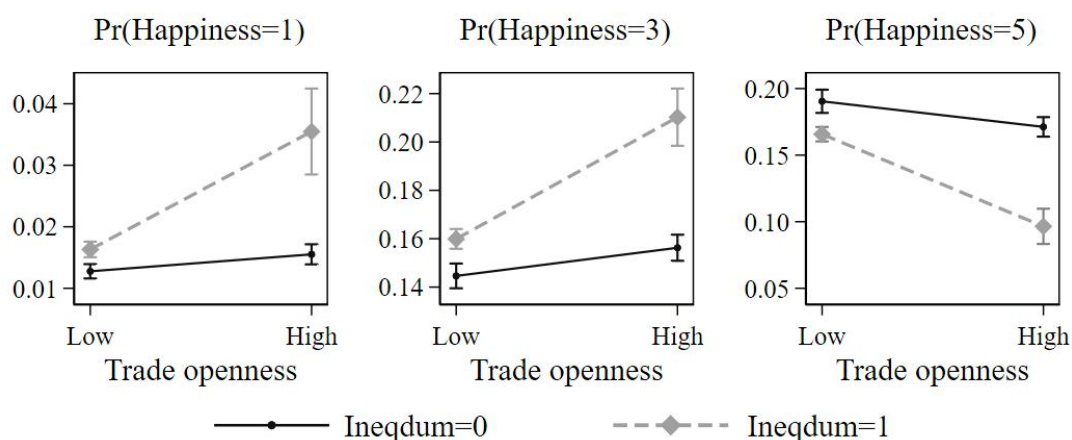


Fig. 2 Marginal effects of trade openness

Notes: The marginal effects on “Relatively unhappy” (Happiness=2) are similar to the marginal effects on “Very unhappy” (Happiness=1). The marginal effects on “Relatively happy” (Happiness=4) are similar to “Very happy” (Happiness=5). All the figures do not report the predicted outcomes of “Relatively unhappy” and “Relatively happy” to save space (these results are available upon request).

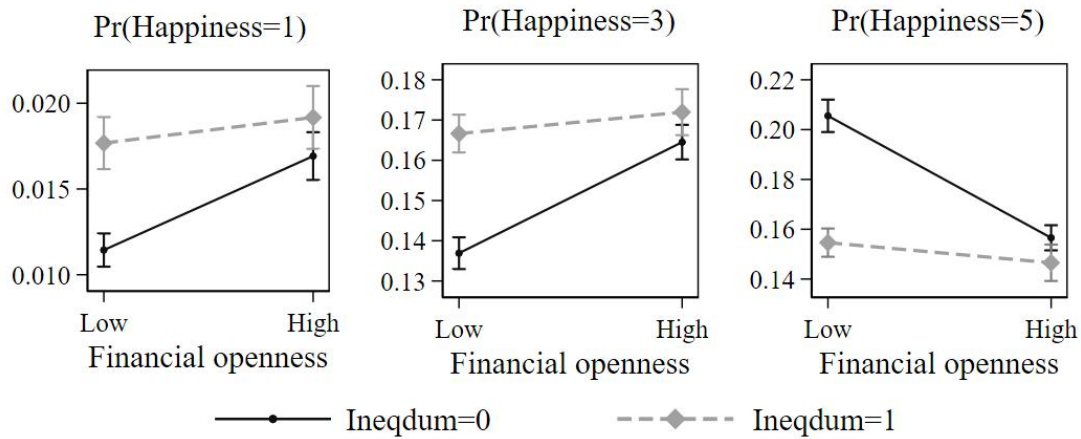


Fig. 3 Marginal effects of financial openness

Figures 4 and 5 depict the marginal effects of inequality at different levels of happiness. It appears that inequality dampens happiness, as shown by the downward slope of the line standing for the impact of inequality on happiness in the third subgraph. Alternatively, in the first subgraph, the line representing the impact on unhappiness has an upward slope. Taken together, these two figures reveal that the marginal probability of unhappiness for residents in areas with higher inequality is greater than those with low inequality, which is consistent with our previous results.

Note also that there are two lines in each subgraph. The gray line stands for the marginal effect of inequality on the wellbeing of residents living in areas with lower openness, while the black line stands for that in areas with higher openness. Looking closely at Figure 4, in areas with high trade openness, the marginal effect of inequality on unhappiness is higher than that in areas with low trade openness. Hence, Figure 4 reflects that trade openness strengthens the negative effect of inequality on happiness. Such moderating effect diminishes as inequality increases, as implied by the narrowing gap between the two lines in the first subgraph. Rather, Figure 5 shows that in regions with high financial openness, the marginal effect of inequality on unhappiness is less than that in regions with low financial openness, suggesting that financial openness weakens the negative effect of inequality on happiness. This adjustment effect, as shown in the first subgraph, also shrinks when inequality increases.

To sum up, rural-urban inequality has a moderation effect on the impact of openness on happiness: it strengthens the positive impact of trade openness and weakens the negative impact of financial openness. In turn, the negative impact that inequality exerts on happiness is exacerbated by trade openness and impaired by financial openness.

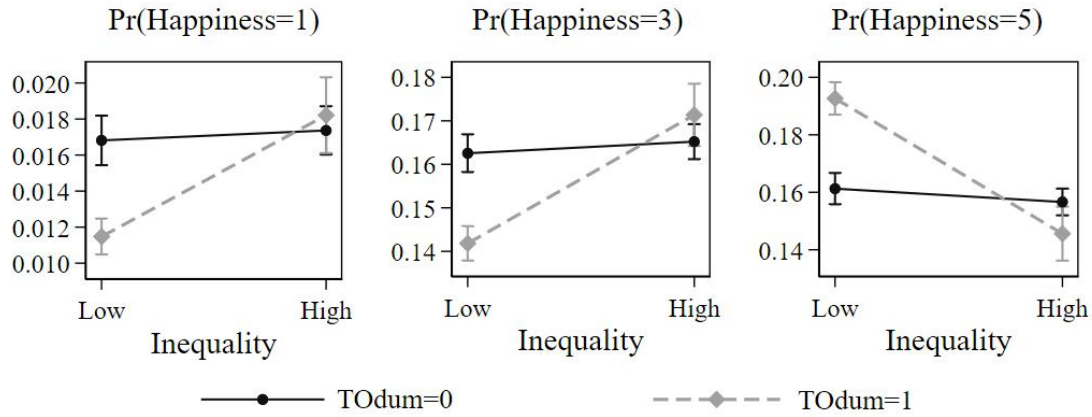


Fig. 4 Interaction of inequality and trade openness

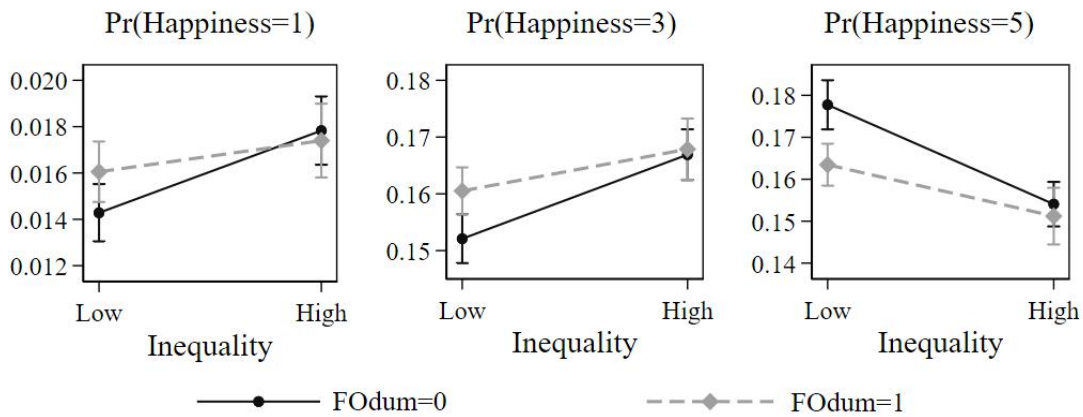


Fig. 5 Interaction of inequality and financial openness

3.3 Robustness check

Considering that individuals are more aware of and affected by what happens in their surroundings, an alternative and perhaps better measure of inequality might be estimated at a lower level of areas, such as counties (Xian) or districts (Qu). Previous literature (e.g., Tran et al., 2018) uses a small estimation method to estimate inequality indicators at the community level. However, due to privacy policy, the CGSS does not release the information for the location of the sample below the provincial level. Thus, we could not match the CGSS data with other databases below the provincial level. A workaround is to use CGSS data directly for calculations. In doing so, considering that the survey did not cover every county (some counties have only urban samples with few rural samples, or the other way around), we excluded counties with proportion of rural sample below 10% or above 90% to avoid sample bias. The remaining sample size is 9626, covering 167 county-years.

The results are reported in Table 7. We first replace the inequality indicator with the county-level urban-rural income ratio, which is the ratio of the average income of urban residents to the average income of rural residents in the county for each year. The second alternative is the between-group component of the Gini coefficient, which

is obtained by decomposing the county's Gini coefficient according to the sample type for each year.

From the results in Table 7 we can see that, the coefficients on trade and financial openness preserve the same signs and significances as before. This confirms that the inverted U-shaped relationship between trade openness and happiness and the U-shaped relationship between financial openness and happiness still holds for different measures of inequality. Moreover, the threshold of turning point is 0.21 for trade openness and 2 for financial openness, situated between the minimum and the mean value. However, it turns out that the county-level inequality indicator and happiness are positively correlated. This result is consistent with Kelly and Evans (2017), suggesting that the Kuznets curve may indeed exist: in the early stage of economic development, unequal income growth may enhance happiness. In this case, trade openness would depress the marginal impact of inequality, as indicated by the significantly negative coefficients on the interaction terms for trade openness and inequality. Likewise, financial openness tends to reduce the marginal impact of inequality and thus depresses happiness, although the related coefficients are not statistically significance.

Table 7 Robustness to county level measures of inequality

Dependent variable: Happiness	(1)	(2)
	Income ratio	Between-group Gini
Trade openness	1.054*** (0.41)	0.940** (0.39)
Trade openness squared	-2.494*** (0.49)	-2.609*** (0.49)
Financial openness	-0.196*** (0.07)	-0.188*** (0.06)
Financial openness squared	0.049*** (0.01)	0.051*** (0.01)
Inequality	0.043 (0.03)	1.032*** (0.35)
Inequality × Trade openness	-0.162* (0.08)	-1.297 (0.93)
Inequality × Financial openness	-0.004 (0.02)	-0.235 (0.19)
Controls	Yes	Yes
Year	Yes	Yes
LR statistic	1095.13***	1103.15***
Pseudo R-squared	0.06	0.06
Number of observations	9626	9626

Notes: (1) Robust standard errors are in parentheses; (2) *, **, *** indicate statistically significant at the 10%, 5% and 1% level respectively; (3) All regressions include full controls but not reported in the table to save space (these results are

available upon request).

4. Further discussion: cohort differences

In the previous two subsections, we have analyzed the effects of trade openness, financial openness, and rural-urban income inequality on happiness in China and tested the robustness of the results. Considering the variety of social classes and the enlarging gap between urban and rural areas in recent years, both of which may lead to notable differences among different cohorts, in this subsection we proceed to explore the following question: Are there any differences in the effects of openness and rural-urban income inequality on happiness among different cohorts in China? To answer this question, we divide the entire sample into corresponding subsamples and redo the regressions in a similar fashion as before.

First, we examine whether our main results are robust to different income groups and residential status. As in conventional in the literature, we classify the sample into three categories based on the household income of the respondents. As shown in Table 8, the numbers of households in each group are roughly equal. Then we repeated the regression analysis for each sub-sample, with the results presented in Table 9. It is evident from Table 9 that the main results generally holds for all income groups, despite some differences in statistical insignificance. Notably, the high-income households are the only group sensitive to the inverted U-shaped relationship between trade openness and happiness, yet insensitive to the negative impact of inequality. This is understandable because high-income households may benefit from trade openness (Turnovsky and Rojas-Vallejos, 2018), and rural-urban inequality further enhances the benefits from trade openness, as we analyzed above. Meanwhile, trade openness strengthens the negative impact of inequality on happiness. Consequently, the subjective wellbeing of middle- and low-income households are hardly enhanced by trade openness but significantly impaired by inequality, implying that the gains of the rich from trade openness and inequality are at the cost of the low and middle classes.

Columns (4) and (5) report the results for the urban group and the rural group respectively, from which we can see that, again, our main results remain robust for both groups. Exceptions are that the coefficients on the level term and the interaction term of trade openness for rural residents are different from the baseline results, although statistically insignificant. One possible explanation is that for foreign trade, cities are more attractive than rural areas. While urban areas enjoy the convenience and prosperity brought by trade openness, rural areas may suffer from labor outflows, aging population, abandoned farmlands, as well as other social costs. In addition, taking into account that the income of rural residents (with an average of 39266 in the sample) is much lower than that of urban residents (with an average income of 69003), this result is also consistent with those presented in Columns (1) and (2): trade

openness and inequality tends to hurt the subjective wellbeing of the poorer group. Overall, the results in Table 9 further confirm the robustness of our main results.

Table 8 The classification of household income over the sample period (Unit: RMB)

Year	Income classification	Low-income households	Middle-income households	High-income households
2010	Income range	≤ 17130	17130-38000	> 38000
	Observations	3,406	3,431	3,379
2011	Income range	≤ 20000	20000-40000	> 40000
	Observations	2,014	1,369	1,488
2012	Income range	≤ 20000	20000-50000	> 50000
	Observations	3,460	3,793	2,997
2013	Income range	≤ 30000	30000-60000	> 60000
	Observations	3,996	2,914	2,824
2015	Income range	≤ 30000	30000-60000	> 60000
	Observations	3,986	2,707	2,967
Total		16,862	14,214	13,655

Notes: (1) The entire sample is divided into three subsamples roughly equal in household numbers each year; (2) Each interval includes the upper boundary and excludes the lower boundary.

Table 9 Robustness to different income groups and residential status

Dependent variable: Happiness	Household income class			Residential status	
	Low-income	Middle-income	High-income	Urban subsample	Rural subsample
	(1)	(2)	(3)	(4)	(5)
Trade openness	0.225 (0.53)	0.067 (0.41)	0.892*** (0.34)	0.853** (0.35)	-0.225 (0.31)
Trade openness squared	-0.096 (0.14)	-0.167 (0.12)	-0.194* (0.11)	-0.220** (0.10)	-0.333*** (0.10)
Financial openness	-0.280*** (0.08)	-0.227*** (0.07)	-0.428*** (0.07)	-0.296*** (0.06)	-0.234*** (0.07)
Financial openness squared	0.016*** (0.00)	0.011*** (0.00)	0.014*** (0.00)	0.007** (0.00)	0.019*** (0.00)
Inequality	-0.104** (0.04)	-0.107** (0.04)	-0.044 (0.05)	-0.092** (0.04)	-0.114*** (0.04)
Inequality × Trade openness	-0.100 (0.19)	-0.020 (0.14)	-0.373*** (0.11)	-0.307** (0.12)	0.111 (0.11)
Inequality × Financial openness	0.046* (0.02)	0.034 (0.02)	0.113*** (0.02)	0.080*** (0.02)	0.021 (0.02)
Controls	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
LR statistic	1912.68***	1210.66***	1037.57***	2211.65***	2947.66***
Pseudo R-squared	0.05	0.04	0.04	0.06	0.06
Number of observations	16862	14214	13655	18391	26339

Notes: (1) Robust standard errors are in parentheses; (2) *, **, *** indicate statistically significant at the 10%, 5% and 1% level respectively; (3) All regressions include full controls but not reported in the table to save space (these results are available upon request).

Second, considering the diversity of individual characteristics, it is also worthwhile to assess whether there are differences in the effects of openness and rural-urban inequality on happiness across different groups of people with different genders, different ethnicities, and different religious beliefs. According to the results in Table 10, we can see that the coefficients for financial openness remain largely stable across all groups, but the coefficients for trade openness exhibit differences in statistical significance. This indicates that the two aspects of openness might influence subjective wellbeing through different mechanisms, which further confirms our previous hypothesis that the modeling of openness by classifying into two dimensions is of necessity to reveal the potential differences.

Interestingly, even after controlling for income, the regression results for the wealthier group under each division remain supportive for the baseline results, but there are minor differences that exist in the inferior groups: the coefficients on trade openness are less significant. In other words, trade openness mainly benefits rich people and thus enhances their happiness. Besides income differences, another underlying reason is that males are the primary labor force in China¹, thereby females, especially housewives, are less likely to be affected by trade openness.

Table 10 Robustness to different genders, different ethnicities and different religious beliefs

Dependent variable:	Gender		Ethnicity		Religious belief	
	Male	Female	Han	Minority	Believer	Nonbeliever
Happiness						
Trade openness	0.844** *	0.378	0.405*	1.761	0.571	0.423*
	(0.31)	(0.30)	(0.22)	(1.37)	(0.54)	(0.24)
Trade openness squared	-0.215**	-0.143	-0.197** *	-0.617*	-0.141	-0.183** *
	(0.09)	(0.09)	(0.07)	(0.36)	(0.15)	(0.07)
Financial openness	-0.335** *	-0.332** *	-0.287** *	-0.878* **	-0.437* **	-0.280** *
	(0.06)	(0.06)	(0.04)	(0.17)	(0.13)	(0.04)
Financial openness squared	0.015** *	0.015** *	0.014** *	0.018* *	0.022* **	0.013** *
	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.00)
Inequality	-0.088**	-0.112** *	-0.130** *	-0.164*	-0.097	-0.097** *
	(0.04)	(0.04)	(0.03)	(0.09)	(0.07)	(0.03)
Inequality × Trade openness	-0.309** *	-0.143	-0.150**	-0.369	-0.217	-0.155*
	(0.11)	(0.10)	(0.08)	(0.49)	(0.18)	(0.08)
Inequality × Financial openness	0.069** *	0.066** *	0.052** *	0.268* **	0.082* *	0.054** *
	(0.02)	(0.02)	(0.01)	(0.05)	(2.07)	(4.13)
Controls	Yes	Yes	Yes	Yes	Yes	Yes

¹ According to China Labour Statistical Yearbook, total employments in 2018 amount to 111,711 thousand people, among which 37,687 thousand people are female.

Year	Yes	Yes	Yes	Yes	Yes	Yes
LR statistic	2703.98 ***	2423.41 ***	4769.28 ***	524.90 ***	694.45 ***	4477.78 ***
Pseudo R-squared	0.06	0.05	0.06	0.07	0.06	0.06
Number of observations	22131	22600	41096	3635	5323	39408
Mean income	53583.0 8	49459.2 8	52375.5 9	41595. 50	50666. 48	51612.0 9

Notes: (1) Robust standard errors are in parentheses; (2) *, **, *** indicate statistically significant at the 10%, 5% and 1% level respectively; (3) All regressions include full controls but not reported in the table to save space (these results are available upon request).

5. Concluding Remarks

Despite the vast literature on the various determinants of happiness, very little is known about how openness may affect people's happiness in the current literature. In this paper, we attempt to fill this gap, albeit partially, through an empirical analysis of the CGSS data from China. Several results seem particularly interesting. First, we find that both trade openness and financial openness have a statistically significant impact on happiness, but their effects seem to be going in opposite directions. Specifically, the effect of trade openness on happiness is inverted U-shaped, whereas that of financial openness turns out to be U-shaped. Second, we find that rural-urban income inequality has a significantly negative effect on happiness, which is highly consistent with the previous studies. Third, we find that the negative effect of rural-urban income inequality on happiness would be strengthened by an increase in trade openness but weakened by an increase in financial openness. These results are proved to be robust to different estimation strategies and a variety of sensitivity checks.

This paper contributes to the existing literature in three folds. First, our results not only identify openness as an essential determinant of happiness but also highlight the different effects that are associated with different dimensions of openness (i.e., financial openness and trade openness). Second, our paper extends the literature on inequality-happiness nexus by showing that the effect of rural-urban inequality on happiness also depends on trade and financial openness. And the favorable adjustment effects of openness seem to spread unevenly across cohorts. Third, the main findings of this paper also complement the studies on the determinants of the subjective wellbeing in an emerging market economy like China, where economic and financial opening policies may face some contradictions between opening up the market and maintaining individual happiness.

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