Explaining Individual Subjective Well-Being of Urban China Based on the Four-Capital Model

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Abstract: A growing body of literature explains subjective well-being (SWB) from different perspectives. The statement of “built, human, social, and natural capital are necessary determinants of SWB” is named the four-capital model. Based on a cross-sectional dataset in 2013, which included 3293 individuals and covered the urban areas of most provinces in China, this paper employs the four-capital model to explain individual SWB of urban China. We select individual income and household income per capita as proxies of built capital; physical health and education as proxies of human capital; social connection and social trust as proxies of social capital; and air quality as a proxy of natural capital. In the four-capital model, household income per capita and physical health have almost the same and larger positive impacts on individual SWB of urban China; social connection, social trust, and air quality have smaller and diminishing positive impacts on individual SWB of urban China; and individual income and education are statistically insignificant. The empirical results offer guidance on how to achieve human-centered urbanization for China. This paper provides insights into how to further improve human well-being of urban residents in China and the applicability of the four-capital model in explaining SWB at the individual level.

Keywords: subjective well-being; four-capital model; individual level; urban China

1. Introduction

Well-being improvement is the overarching and ultimate goal that humanity should pursue [1–3]. Because of its directness in measuring human well-being, subjective well-being (SWB) has been acknowledged and accepted as one of the most appropriate measures of human well-being and has gained increasing attention for policy-making in recent years [4–6]. More and more studies have explored which factors are determinants of SWB. Because economic factors alone are not enough to explain SWB, social, ecological, personal, and other factors have been given more attention to explain SWB [7,8]. Some analytical frameworks and models are also proposed to conduct research on SWB.

Vemuri and Costanza [9], Costanza et al. [10], Abdallah et al. [11], and Costanza et al. [1,12] propose that four types of capital, i.e., built, human, social, and natural capital, are necessary determinants of SWB. Based on the four types of capital, Vemuri and Costanza [9] propose to create a National Well-being Index. Costanza et al. [1,12] further argue that built, human, social, and natural capital are basic and essential elements for humanity as a whole to achieve the overall goal of sustainable well-being. The four types of capital are also in accordance with the three pillars of sustainable development, i.e., the economic pillar (built and human capital), the social pillar (human and social capital), and the environmental pillar (natural capital).
In this paper, the statement of “Built, human, social and natural capital are necessary determinants of SWB” is named the four-capital model. Although there are certainly a lot of other determinants of SWB, which are not directly related to the four types of capital, the four-capital model proposed indeed provides us with a theoretical and empirical framework to discuss the possible determinants of SWB. Selecting the appropriate proxies of SWB and the four types of capital and empirically analyzing the impacts of the four types of capital on SWB are helpful for making specific policies, which are designed to improve human well-being.

The four-capital model has been employed by Vemuri and Costanza [9] and Abdallah et al. [11] to empirically explain SWB at the national level. Vemuri and Costanza [9] select the Human Development Index (HDI) as a proxy of human-built capital, the ecosystem services product (ESP) as a proxy of natural capital and the Freedom House’s press freedom rating as a proxy of social capital. Based on a cross-sectional dataset of 56 countries around 1995, Vemuri and Costanza [9] find that human-built capital and natural capital have significant positive impacts on national SWB, whereas that social capital is not significantly related with national SWB.

Following Vemuri and Costanza [9], Abdallah et al. [11] select the HDI, education, life expectancy, and gross domestic product to measure human-built capital, the ESP as a key indicator of natural capital, and voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption to measure social capital. Based on a cross-sectional dataset of 79 countries around 2000, Abdallah et al. [11] demonstrate that all of the selected proxies are significantly and positively related with national SWB, which indicates that the four types of capital have significant positive impacts on national SWB. Both Vemuri and Costanza [9] and Abdallah et al. [11] further take advantage of the significant positive relationships between the three or four types of capital and national SWB to predict the SWB levels of other countries.

Although estimations of the impacts of social capital on national SWB are not consistent in Vemuri and Costanza [9] and Abdallah et al. [11], the four-capital model has been empirically proven to be meaningful at the national level. It is still an unanswered question as to whether the four-capital model will make any sense in explaining individual SWB. Therefore, the four-capital model needs to be tested at the individual level. Because more specific and abundant information on SWB and the four types of capital can be obtained at the individual level, using and simultaneously testing the four-capital model at the individual level will tell more interesting stories about the SWB research.

China, the largest developing country, has been a research object of many questions and topics, because China has achieved outstanding successes and progresses in economic domains over the past 40 years. Most Chinese have shaken off poverty and enjoy relatively affluent lives. On the basis of economic achievement, China has begun to take more and more efforts in tackling various problems in the social and ecological domains in order to transform rapid economic growth into high-quality development. How to improve overall human well-being has already been the top policy priority of the Communist Party and the central government of China. A growing body of literature has explored how to improve individual SWB of China from different analytical perspectives. For example, Abbott et al. [13] empirically explore the factors that affect individual SWB of China by employing the social quality model.

According to the World Bank, 57.90% of the total population lived in urban areas in China in 2017 (https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?view=chart, 26 July 2018). China has been taking tremendous and effective measures to accelerate urbanization and almost one billion Chinese will live in urban areas in the future [14,15]. The urbanization of China is a very important socio-economic and demographic transition, which attracts global attention and can offer valuable lessons to other developing countries. Therefore, empirically exploring the determinants of individual SWB of urban China from new analytical perspectives will make a lot of sense for the researchers and policy-makers. The empirical results will at least provide guidance for China on how to achieve human-centered urbanization.
The aim of this paper is to empirically explain individual SWB of urban China by employing the four-capital model. The empirical analysis is based on a national survey in 2013, which interviewed more than 3000 adults and covered urban areas of most provinces in China. Some indicators that we choose from the survey, such as the indicators of social capital, can make up for the shortcomings of Vemuri and Costanza [9] and Abdallah et al. [11]. To make our empirical estimations more reliable and robust than those of Vemuri and Costanza [9] and Abdallah et al. [11], we employ two methods to estimate the relationships between the four types of capital and individual SWB of urban China. To our knowledge, this paper is the first to test and employ the four-capital model at the individual level (some other studies, such as Zorondo-Rodríguez et al. [8], Hommerich and Tiefenbach [7] and Neira et al. [16], employ one or several out of the four types of capital to explain individual SWB. Zorondo-Rodríguez et al. [8] explore the impacts of natural and built capital on individual SWB. Both Hommerich and Tiefenbach [7] and Neira et al. [16] explore the impacts of social capital on individual SWB. What we stress is that this paper is the first to employ the whole four-capital model, rather than one or several out of the four types of capital, to explain individual SWB). The empirical findings will not only provide insights into how to improve individual SWB of urban China, but also a specific case to discuss the applicability of the four-capital model in explaining individual SWB.

The remainder of this paper is organized as follows. Section 2 introduces the data source, the indicators of individual SWB and the four types of capital and the control variables used in the following regressions. Section 3 presents the regression estimations of the impacts of the four types of capital on individual SWB of urban China. The discussion and conclusions are presented in Sections 4 and 5, respectively.

2. Data, Indicators, and Control Variables

The data source, the indicators of individual SWB, and the four types of capital and the control variables used in the following regressions are introduced and discussed. Statistical descriptions of the variables are also presented.

2.1. Data Source

The data used were obtained from the Chinese General Social Survey (CGSS). The CGSS was initiated in 2003 and is the earliest national representative continuous survey project, which is run by the Department of Sociology of Renmin University of China and the Survey Research Centre of Hong Kong University of Science and Technology. To make the survey data scientific and reliable, the CGSS employs a multistage (four-phase) stratified sampling method to conduct interviews and surveys.

The research objects that we select are the adult residents (aged 18 or over) (because the urban residents under 18 could not give reasonable and reliable answers to the survey questions, the urban residents under 18 were not included in the CGSS 2013), who were interviewed in the CGSS 2013. After sorting out the data, we finally obtain a sample of 3293 individuals in 2013. The sample covered the urban areas of most provinces in China and only Tibet, Inner Mongolia and Hainan were not covered. The urban areas refer to the central areas of selected cities and county towns in China (in China, the urbanization means that agricultural population immigrates into not only cities but also towns. Therefore, the urban areas refer to both cities and towns. For towns in China, most residents are non-agricultural populations and the scales of commerce and built-up lands are smaller than those of cities. The governmental agencies at the county level are often located in towns. In general, the population size of a typical town in China is not less than 30 thousand). In this sense, it can be said that our sample is quite representative of urban China.

2.2. Indicators of Individual SWB and Four Types of Capital

The indicators of individual SWB and the four types of capital are introduced (the selections of indicators of individual SWB and the four-types of capital are mainly based on: (1) the meanings of individual SWB and the four types of capital. The indicators should capture the essences of and fulfill
their missions to measure individual SWB and the four types of capital; (2) the previous studies, such as Zorondo-Rodríguez et al. [8] and Hommerich and Tiefenbach [7]; and (3) what can be obtained from the data source (the CGSS 2013). As to which indicators to finally choose, we have to be very pragmatic. Some other indicators may be better, but we cannot find the corresponding information in the data source (the CGSS 2013)). How to assign values to the indicators is also discussed in a detailed manner.

2.2.1. Individual SWB

Life satisfaction and happiness are often used to measure individual SWB. Although some studies use the two terms (i.e., life satisfaction and happiness) interchangeably, the two terms have distinct meanings and measure two different aspects of individual SWB [16–18]. Life satisfaction is respondents’ cognitive evaluations of their lives and measures stable and long-term living conditions, whereas happiness is individual affective experiences and measures respondents’ situation-dependent and short-term emotions [19,20]. Life satisfaction is a measure of “life evaluation”, whereas happiness is a measure of “emotional well-being” [21,22]. It can be inferred that relative to happiness, life satisfaction is more appropriate to measure individual well-being [9].

In this paper, individual SWB is measured by life satisfaction, which is derived from the question “All things considered, how satisfied are you with your life as a whole these days?” We code “very dissatisfied” as 1, “dissatisfied” as 2, “so-so” as 3, “satisfied” as 4 and “very satisfied” as 5.

2.2.2. Built Capital

At the individual level, built capital refers to economic factors and income is often used to measure built capital [8,23]. In practical terms, the income data of the urban residents of China are also much easier to obtain than other indicators. To obtain a more comprehensive insight into the income information of the urban residents, we select two proxies, individual income and household income per capita, to measure built capital. In China, in which families are treated as being more important than individuals [18], household income per capita is likely to be more important than individual income in explaining individual SWB.

The measure of individual income is derived from the question “What is your total individual income in 2012?”. The measure of household income is derived from the question “What is your total household income in 2012?”. Household income per capita is calculated as a ratio of total household income to the family size. The unit of individual income and household income per capita is expressed in yuan. To avoid the impacts of abnormal and extreme income values, all of the income values used in the following regressions are in the confidence interval of (5–95%).

2.2.3. Human Capital

Two proxies, physical health and education, are selected to measure human capital. Physical health measures whether the urban residents are physically healthy to live and work, while education measures whether the urban residents have the abilities and knowledge to pursue a more meaningful life. The two proxies can provide a relatively complete picture and a reasonable approximation of human capital.

The measure of physical health is derived from the question “How do you think of your physical health?”. We code “very unhealthy” as 1, “unhealthy” as 2, “so-so” as 3, “healthy” as 4 and “very healthy” as 5. The measure of education is derived from the question “Until now, what is your highest education level?”. In the CGSS 2013, the respondents did not directly answer “years of schooling”. Instead, they responded by answering their “levels of education”. For the convenience of empirical estimations, according to the normal time to obtain a certain level of education, we transform “levels of education” into “years of schooling”. We code “illiteracy” as 0, “primary school” as 6, “secondary school” as 9, “high school (including vocational high school)” as 12, “junior college” as 15, “undergraduate” as 16 and “postgraduate and above” as 19.
The indicators of built and human capital that we select are highly interrelated with the well-known HDI. The HDI consists of three dimensions, i.e., a decent standard of living (measured by Gross National Income per capita), a long and healthy life (measured by life expectancy at birth), and access to knowledge (measured by mean years of schooling and expected years of schooling). At the individual level, individual income and household income per capita can measure a decent standard of living, physical health can measure a long and healthy life, and education can measure access to knowledge. Therefore, the indicators of built and human capital can be combined and treated as individual HDI.

2.2.4. Social Capital

Two proxies, social connection and social trust, are employed to measure social capital. Social connection measures the relationships and connections with family members, relatives and friends, while social trust measures the general attitudes towards strangers and whether society is honest or not. The two proxies can capture the essence of social capital, i.e., the strength of family and friendship networks and mutual trust among strangers [7,24,25].

The measure of social connection is derived from the question “How are your connections with family members, relatives and friends in general?”. We code “very unfamiliar” as 1, “unfamiliar” as 2, “so-so” as 3, “close” as 4, and “very close” as 5. The measure of social trust is derived from the question “Generally, do you trust strangers?”. We code “very trustless” as 1, “trustless” as 2, “so-so” as 3, “trustful” as 4, and “very trustful” as 5.

2.2.5. Natural Capital

Natural capital can be understood as natural assets and stocks that generate ecological goods and services [26,27]. At the individual level, it is very difficult to select a relatively comprehensive proxy of natural capital, such as the ESP proposed by Vemuri and Costanza [9] and the Biocapacity proposed by Zhang et al. [27]. Although it only provides limited ecological services, air quality has widespread, profound, and direct impacts on the daily lives of urban residents. Urban residents often tend to discuss air quality when the topic of natural capital is raised. Therefore, air quality is employed to measure natural capital.

The measure of air quality is derived from the question “How do you think of air pollution in your dwelling place?”. We code “very serious” as 1, “relatively serious” as 2, “not too serious” as 3, “not serious” as 4, “so-so” as 5, and “no air pollution” as 6. As can be seen, larger values denote better air quality.

2.3. Control Variables

According to previous studies and data availability, the following variables were taken as the control variables: (1) age and square of age [16,28,29]; (2) “Married”, “Divorced” and “Widowed” [16,18,28], which are dummy variables to measure marital status (“Unmarried” as a reference). “Married” has a value of one if the respondent is married, and zero otherwise. “Divorced” has a value of one if the respondent is divorced, and zero otherwise. “Widowed” has a value of one if the respondent is widowed, and zero otherwise; (3) “Male” [16,18,23], which is a dummy variable with a value of one for men and zero for women. In urban China, men often take on more responsibilities and have more stresses in supporting their families, so they are likely to be less satisfied with their lives than women; (4) “Han”, which is a dummy variable with a value of one for the Han nationality and zero for the minority nationalities. In China, there are 56 nationalities in total. The 56 nationalities can be divided into two categories, that is, the Han nationality and the other 55 minority nationalities. The minority nationalities in China often have some privileges, such as being easier to get access to better education resources and having less birth control regulations in place, which may make them more satisfied with their lives; (5) “Communist Party member”, which is a dummy variable with a value of one if the respondent is a Communist Party member of China, and zero otherwise. In China,
the Communist Party is the only ruling party and the members of the Communist Party may have more chances to get promoted, which may make the members more satisfied with their lives; (6) “Religion” [16,20,30], which is a dummy variable with a value of one if the respondent has religious beliefs, and zero otherwise. Religious beliefs and engaging in religious activities may make the urban residents more satisfied with their lives [31]; and (7) provincial characteristics, which are included to capture the impacts of specific socio-economic and demographic characteristics of the provinces on individual SWB of urban China.

2.4. Statistical Descriptions of Variables

Table 1 shows statistical descriptions of the above variables. The mean value of life satisfaction is 3.77, which is between the values for “so-so” and “satisfied”. The minimum and maximum values of individual income are 0 and 70,000.00 yuan, respectively. The mean value of individual income is 30,791.11 yuan, which is lower than half of the maximum value. The minimum and maximum values of household income per capita are 1666.67 and 61,000.00 yuan, respectively. The mean value of household income per capita is 26,850.28 yuan, which is also lower than half of the maximum value. The mean value of physical health is 3.86, which is between the values for “so-so” and “healthy”. The mean value of education is 11.21, which is between the values for “secondary school” and “high school”. The mean value of social connection is 3.49, which is between the values for “so-so” and “close”. The mean value of social trust is 2.59, which is between the values for “trustless” and “so-so”. The mean value of air quality is 2.72, which is between the values for “relatively serious” and “not too serious”.

| Variable                  | Mean  | SD   | Min  | Max   |
|---------------------------|-------|------|------|-------|
| Individual SWB Life       | 3.77  | 0.82 | 1    | 5     |
| Built capital Individual income | 30,791.11 | 20,512.05 | 0   | 70,000.00 |
| Household income per capita | 26,850.28 | 16,653.81 | 1666.67 | 61,000.00 |
| Human capital Physical health | 3.86 | 0.96 | 1    | 5     |
| Education                 | 11.21 | 4.11 | 0    | 19    |
| Social capital Social connection | 3.49 | 0.83 | 1    | 5     |
| Social trust              | 2.59  | 0.88 | 1    | 5     |
| Natural capital Air quality | 2.72 | 1.42 | 1    | 6     |
| Control variables Age     | 47.80 | 16.39 | 18   | 96    |
| Married                   | 0.77  | 0.42 | 0    | 1     |
| Divorced                  | 0.03  | 0.18 | 0    | 1     |
| Widowed                   | 0.07  | 0.25 | 0    | 1     |
| Male                      | 0.53  | 0.50 | 0    | 1     |
| Han                       | 0.94  | 0.24 | 0    | 1     |
| Communist Party member    | 0.17  | 0.38 | 0    | 1     |
| Religion                  | 0.10  | 0.30 | 0    | 1     |

Notes: The unit of individual income and household income per capita is expressed in yuan. SWB: subjective well-being.

From the mean values of the control variables, we can learn more about the urban residents in the sample. The ages of the urban residents are between 18 and 96 and the mean age is about 48. It can be found that 77% of the urban residents are married, 3% of the urban residents are divorced, and 7% of the urban residents are widowed. Fifty-three percent of the urban residents are male. The nationality of 94% of the urban residents is the Han. Seventeen percent of the urban residents are Communist Party members. Ten percent of the urban residents have religious beliefs.
3. Regression Estimation Results

Two regression methods, Ordered Probit regressions and Ordinary Least Square regressions, are used to estimate the impacts of the four types of capital on individual SWB of urban China. The two regression methods can serve as robustness checks for each other. Because the marginal utility of transforming income into individual SWB is diminishing [32,33], the natural log forms of individual income and household income per capita are employed in the following regressions. Furthermore, because the individual income values of some respondents are zero, Ln (1 + individual income), rather than Ln (individual income), is employed. All of the other variables are kept in their original forms in the regressions.

Tables 2 and 3 show the Ordered Probit regression results and Ordinary Least Square regression results of the impacts of the four types of capital on individual SWB of urban China, respectively. Model (1) in Tables 2 and 3 are regressions with only the control variables. Model (2–5) in Tables 2 and 3 are regressions with only one of the four types of capital and the control variables. Model (6) in Tables 2 and 3 are regressions with the four types of capital and the control variables. In Tables 2 and 3, the values of Pseudo $R^2$ and R-squared in Model (2–5) are larger than those in Model (1), which demonstrates that any one of the four types of capital can make contribution to explaining individual SWB of urban China. In Tables 2 and 3, the values of Pseudo $R^2$ and R-squared in Model (6) are larger than those in Model (1–5), which demonstrates that Model (6) can be regarded as the better models to explain individual SWB of urban China.

The estimated relationships between the four types of capital and individual SWB of urban China are quite consistent in Tables 2 and 3, which to some extent can demonstrate that the regression estimations are robust. Furthermore, the Variance Inflation Factor (VIF) values of all of the seven indicators of the four types of capital in Table 3 are lower than two, which demonstrates that the regression estimations in Table 3 are not likely to be affected by problems with multicollinearity [27,34,35].

For the two proxies of built capital, individual income is not statistically significant in Model (2) or (6), whereas household income per capita is statistically significant with the positive sign at the 1% level in both Models (2) and (6). For the two proxies of human capital, physical health is statistically significant with the positive sign at the 1% level in both Models (3) and (6), whereas education is only statistically significant with the positive sign at the 5% level in Model (3). The fact that education is not statistically significant in Model (6) demonstrates that in the four-capital model, education is not yet an independent determinant of individual SWB of urban China. For the two proxies of social capital, both social connection and social trust are statistically significant with the positive sign at the 1% level in both Models (4) and (6). For the proxy of natural capital, air quality is statistically significant with the positive sign at the 1% level in both Models (5) and (6).

|                      | Model (1) | Model (2) | Model (3) | Model (4) | Model (5) | Model (6) |
|----------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| **Built capital**    |           |           |           |           |           |           |
| Individual income    | $-0.011$  |           |           | $-0.012$  |           |           |
| Household income per | $0.335$ ***| $0.258$ ***|           |           |           |           |
| capita               | ($0.008$) | ($0.037$) |           |           |           |           |
| **Human capital**    |           |           |           |           |           |           |
| Physical health      |           |           |           |           |           | $0.261$ ***|
| Education            |           |           |           |           |           | ($0.025$) |
|                      |           |           |           |           |           | ($0.006$) |
| **Social capital**   |           |           |           |           |           |           |
| Social connection    |           |           |           |           |           | $0.192$ ***|
|                      |           |           |           |           |           | ($0.027$) |
| Social trust         |           |           |           |           |           | $0.112$ ***|
|                      |           |           |           |           |           | ($0.025$) |
Table 2. Cont.

| Natural capital | Model (1) | Model (2) | Model (3) | Model (4) | Model (5) | Model (6) |
|-----------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Air quality     | -0.050*** | -0.046*** | -0.045*** | -0.047*** | -0.051*** | -0.042*** |
|                 | (0.010)   | (0.009)   | (0.009)   | (0.009)   | (0.009)   | (0.009)   |
| Age             | 0.0005*** | 0.0005*** | 0.0005*** | 0.0005*** | 0.0005*** | 0.0005*** |
|                 | (0.000)   | (0.000)   | (0.000)   | (0.000)   | (0.000)   | (0.000)   |
| Square of age   | 0.322***  | 0.319***  | 0.288***  | 0.336***  | 0.332***  | 0.317***  |
|                 | (0.113)   | (0.078)   | (0.078)   | (0.077)   | (0.078)   | (0.077)   |
| Married         | -0.347**  | -0.258*   | -0.344**  | -0.319**  | -0.353**  | -0.204**  |
|                 | (0.143)   | (0.138)   | (0.137)   | (0.139)   | (0.138)   | (0.139)   |
| Divorced        | 0.103     | 0.186     | 0.102     | 0.108     | 0.093     | 0.160     |
|                 | (0.149)   | (0.121)   | (0.119)   | (0.120)   | (0.120)   | (0.120)   |
| Widowed         | -0.153*** | -0.145*** | -0.180*** | -0.125*** | -0.154*** | -0.144*** |
|                 | (0.043)   | (0.040)   | (0.040)   | (0.039)   | (0.039)   | (0.041)   |
| Male            | -0.303*   | -0.314*** | -0.306*** | -0.284*** | -0.301*** | -0.275*** |
|                 | (0.166)   | (0.099)   | (0.096)   | (0.098)   | (0.098)   | (0.099)   |
| Han             | 0.217***  | 0.126**   | 0.163***  | 0.152**   | 0.222**   | 0.091     |
|                 | (0.047)   | (0.053)   | (0.054)   | (0.052)   | (0.052)   | (0.055)   |
| Communist Party | 0.254**   | 0.261***  | 0.257***  | 0.222***  | 0.252**   | 0.252**   |
| member          | (0.120)   | (0.079)   | (0.079)   | (0.080)   | (0.080)   | (0.079)   |
| Religion        | YES       | YES       | YES       | YES       | YES       | YES       |
| Provincial      | N         | 3293      | 3293      | 3293      | 3293      | 3293      |
| characteristics | YES       | YES       | YES       | YES       | YES       | YES       |
| Pseudo R²       | 0.043     | 0.057     | 0.066     | 0.064     | 0.046     | 0.092     |

Notes: Heteroscedasticity-robust standard errors are in parentheses; *, ** and *** denote significance at the 10%, 5%, and 1% level, respectively; and standard errors are clustered by the town/street names.

Table 3. Ordinary Least Square regressions of impacts of four types of capital on individual SWB of urban China.

| Built capital | Model (1) | Model (2) | Model (3) | Model (4) | Model (5) | Model (6) |
|---------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Individual income | -0.008    | 0.243***  | 0.209***  | 0.209***  | 0.171***  | 0.182***  |
| Household income per capita | (0.006)   | (0.026)   | (0.018)   | (0.018)   | (0.017)   | (0.026)   |
| Human capital | Physical health | 0.011**   | 0.175***  | 0.127***  | 0.096***  | 0.078***  |
|               | (0.004)   | (0.018)   | (0.018)   | (0.017)   | (0.016)   |
| Social capital | Social connection | 0.051***  | 0.175***  | 0.127***  | 0.096***  | 0.078***  |
|               | (0.011)   | (0.018)   | (0.018)   | (0.017)   | (0.016)   |
| Natural capital | Air quality | 0.245***  | 0.251***  | 0.251***  | 0.251***  | 0.251***  |
|               | (0.076)   | (0.054)   | (0.054)   | (0.057)   | (0.052)   |
| Control variables | Age | -0.035*** | -0.032*** | -0.030*** | -0.032*** | -0.035*** |
|               | (0.007)   | (0.006)   | (0.006)   | (0.006)   | (0.006)   | (0.006)   |
|               | Square of age | 0.0003*** | 0.0003*** | 0.0003*** | 0.0003*** | 0.0003*** |
|               | (0.000)   | (0.000)   | (0.000)   | (0.000)   | (0.000)   | (0.000)   |
|               | Married | 0.245***  | 0.251***  | 0.251***  | 0.251***  | 0.251***  |
|               | (0.076)   | (0.054)   | (0.054)   | (0.057)   | (0.052)   |
Table 3. Cont.

| Model | Model | Model | Model | Model | Model |
|-------|-------|-------|-------|-------|-------|
| (1)   | (2)   | (3)   | (4)   | (5)   | (6)   |
| Divorced | -0.307 *** (0.110) | -0.296 *** (0.108) | -0.278 ** (0.110) | -0.311 *** (0.111) | -0.189 * (0.105) |
| Widowed | 0.080 | 0.135 | 0.075 | 0.083 | 0.070 | 0.115 |
| Male | -0.113 *** (0.031) | -0.129 *** (0.027) | -0.091 *** (0.028) | -0.114 *** (0.028) | -0.101 *** (0.028) |
| Han | -0.215 ** (0.034) | -0.220 *** (0.036) | -0.211 *** (0.036) | -0.197 *** (0.035) | -0.212 *** (0.035) | -0.188 *** (0.036) |
| Communist Party member | 0.156 *** (0.078) | 0.158 *** (0.053) | 0.152 *** (0.053) | 0.127 ** (0.054) | 0.154 *** (0.055) | 0.142 *** (0.051) |
| Religion | 0.087 ** (0.036) | 0.109 *** (0.036) | 0.105 *** (0.035) | 0.159 *** (0.035) | 0.056 |
| Provincial characteristics | YES | YES | YES | YES | YES | YES |
| N | 3293 | 3293 | 3293 | 3293 | 3293 | 3293 |
| R-squared | 0.093 | 0.123 | 0.143 | 0.135 | 0.100 | 0.190 |

Notes: Heteroscedasticity-robust standard errors are in parentheses; *, ** and *** denote significance at the 10%, 5%, and 1% level, respectively; and standard errors are clustered by the town/street names.

Based on Model (6) in Table 2, we calculate the marginal impacts of the significant proxies of the four types of capital on individual SWB of urban China. The marginal impacts mean that when all of the other independent variables are kept at their mean values, how the probabilities of the dependent variable with different values will occur, if the value of one certain independent variable changes by a unit or one percent (The calculation of the marginal impacts can be made visible by the formula of $\frac{\partial \Pr(y = i|x)}{\partial x} |_{x=\bar{x}} (i = 1, 2, 3, 4, 5$). Table 4 lists the marginal impacts. Marginal increases in the values of household income per capita, physical health, social connection, social trust, and air quality can reduce the probabilities of reporting “very dissatisfied”, “dissatisfied”, and “so-so” with their lives and increase the probabilities of reporting “satisfied” and “very satisfied” with their lives. For example, when all of the other independent variables are kept at their mean values, the probabilities of reporting “very dissatisfied”, “dissatisfied”, and “so-so” with their lives will decrease by 0.19%, 1.02% and 2.39%, respectively and the probabilities of reporting “satisfied” and “very satisfied” with their lives will increase by 1.45% and 2.16%, respectively, if the value of social trust increases by 1; the probabilities of reporting “very dissatisfied”, “dissatisfied”, and “so-so” with their lives will decrease by 0.45%, 2.35%, and 5.50%, respectively and the probabilities of reporting “satisfied”, and “very satisfied” with their lives will increase by 3.34% and 4.96%, respectively, if the value of household income per capita increases by 1% (Because the natural log form of household income per capita is employed to calculate the marginal impacts, the increase here is 1%, rather than 1).

Table 4. Marginal impacts of four types of capital on individual SWB of urban China.

| Built Capital | Human Capital | Social Capital | Natural Capital |
|---------------|---------------|---------------|----------------|
| Household income per capita | Physical health | Social connection | Social trust | Air quality |
| Very dissatisfied | -0.0045 *** | -0.0045 *** | -0.0033 *** | -0.0019 *** | -0.0010 *** |
| Dissatisfied | -0.0235 *** | -0.0238 *** | -0.0175 *** | -0.0102 *** | -0.0054 *** |
| So-so | -0.0550 *** | -0.0558 *** | -0.0410 *** | -0.0239 *** | -0.0126 *** |
| Satisfied | 0.0334 *** | 0.0339 *** | 0.0249 *** | 0.0145 *** | 0.0076 *** |
| Very satisfied | 0.0496 *** | 0.0503 *** | 0.0369 *** | 0.0216 *** | 0.0113 *** |

Notes: *, ** and *** denote significance at the 10%, 5%, and 1% level, respectively; the natural log form of household income per capita is employed to calculate the marginal impacts.
By comparing the marginal impacts of the significant proxies in Table 4 and also the estimated coefficients of the significant proxies in Model (6) in Tables 2 and 3, we can further find: (1) the positive impacts of household income per capita and physical health on individual SWB of urban China are almost the same, which are much greater than those of social connection, social trust, and air quality; (2) the positive impact of social connection is greater than that of social trust; and (3) the positive impacts of social connection and social trust are greater than that of air quality.

Regression estimations of the impacts of the control variables on individual SWB of urban China are also consistent in general in Tables 2 and 3. Regression estimations of the impacts of age, square of age, “Married”, “Divorced”, and “Widowed” on individual SWB of urban China are consistent with those of previous studies, such as Bertram and Rehdanz [36], Feddersen et al. [29] and Jones [6]. There is a U-shaped relationship between age and individual SWB of urban China. The urban residents of middle ages are less satisfied with their lives as compared to the older and younger residents. Being married makes the urban residents more satisfied with their lives. Except in Model (6) in Table 2, being divorced makes the urban residents less satisfied with their lives. Being widowed has no significant impacts on individual SWB of urban China.

“Male” has significant negative impacts on individual SWB of urban China, which demonstrates that men are less satisfied with their lives than women in urban China. “Han” has significant negative impacts on individual SWB of urban China, which means that the Han nationality is less satisfied with their lives than the minority nationalities. “Communist Party member” has significant positive impacts on individual SWB of urban China in Models (1–5), whereas it is statistically insignificant in Model (6). In the four-capital model, being a Communist Party member is not an independent determinant of individual SWB of urban China. “Religion” has significant positive impacts on individual SWB of urban China, which demonstrates that religious beliefs make the urban residents more satisfied with their lives.

4. Discussion

This paper is motivated by the work of Vemuri and Costanza [9] and Abdallah et al. [11]. As can be seen from the Introduction, neither Vemuri and Costanza [9] nor Abdallah et al. [11] select appropriate measures of social capital, because those proxies do not reflect the strengths of family and friendship networks and mutual trust among strangers [7,16]. Vemuri and Costanza [9] recognize that the proxy they select does not capture the importance of family members and friends. Abdallah et al. [11] even argue that the proxies, which they and Vemuri and Costanza [9] chose, measure political capital rather than social capital. It can also be found that both Vemuri and Costanza [9] and Abdallah et al. [11] conflate the proxies of human and built capital. Moreover, although the regression estimations of Vemuri and Costanza [9] and Abdallah et al. [11] are based on cross-sectional datasets, the national SWB data of Vemuri and Costanza [9] are of different years and the national SWB data of Abdallah et al. [11] are obtained from multiple data sources. The inconsistency of national SWB data may make their regression estimations biased.

In this paper, social connection and social trust are selected to measure social capital. The respective proxies of built and human capital are also employed. The regression estimations are based on a cross-sectional dataset of 3293 individuals in 2013 and all of the data of individual SWB, the four types of capital and the control variables are obtained from an identical data source, i.e., the CGSS 2013. Furthermore, the consistent estimations by employing the two regression methods make the estimated relationships between the four types of capital and individual SWB of urban China more robust. Therefore, in terms of indicators, data quality and regression methods, this paper can to some extent make up for the abovementioned shortcomings of Vemuri and Costanza [9] and Abdallah et al. [11] and the regression estimations of the impacts of the four types of capital on SWB are more reasonable, valid and reliable.

In the four-capital model, for the two proxies of built capital, household income per capita is an independent determinant of individual SWB of urban China, whereas individual income is not.
Based on a cross-sectional data set of 1286 individuals in 2013, Verhofstadt et al. [20] also found that individual income had no significant impacts on individual SWB of Flanders, Belgium. It can be inferred that in financial terms, the urban residents in China care more about or depend more on their families. For those who care more about their families, only when everyone in the family has more disposable income to enjoy a better life will they be more satisfied with their lives. For those who depend more on their families, they will be more satisfied with their lives if they can obtain financial help from their families.

In the four-capital model, for the two proxies of human capital, physical health is an independent determinant of individual SWB of urban China, whereas education is not. It is easy to understand that healthier bodies make the urban residents more satisfied with their lives and that having worse physical health will more easily make them frustrated with their lives. To our surprise, in urban China, higher education levels are not directly converted into higher levels of life satisfaction. Verhofstadt et al. [20] and Zorondo-Rodríguez et al. [8] also find an insignificant relationship between education and individual SWB in Flanders, Belgium and Kodagu, India. The fact that education is statistically significant at the 5% level with the positive sign in Model (3) in Tables 2 and 3 demonstrates that education has indirect impacts on individual SWB of urban China. The indirect impacts of education may be fulfilled through more job choices and higher income levels [18]. In this paper, we statistically find that education is positively correlated with individual income which has positive impacts on household income per capita.

In the four-capital model, both the two indicators of social capital, social connection, and social trust, are independent determinants of individual SWB of urban China. Having closer relationships with friends and family members and trusting strangers more make the urban residents more satisfied with their lives. The fact that social connection has a greater impact on individual SWB of urban China than social trust demonstrates that the urban residents attach more importance to their family members and friends in their daily lives. The above fact is also consistent with the finding that household income per capita has significant and larger positive impacts on individual SWB of urban China. As can be seen from Table 1, the mean value of social trust indicates that the urban residents in China do not trust strangers in general. Therefore, strengthening social trust is also an important way of improving human well-being of urban residents in China.

In the four-capital model, for the proxy of natural capital, air quality is an independent determinant of individual SWB of urban China. Based on a national survey covering 30 cities in 2003, Smyth et al. [37] also empirically prove that air quality, measured by sulfur dioxide, has significant positive impacts on individual SWB of urban China. For the urban residents, air quality directly affects individual SWB and better air quality can make them more satisfied with their lives. Air quality can also indirectly improve individual SWB by improving physical health [38]. It can be further inferred that the urban residents in China do consider ecological services generated from natural capital when they evaluate their general life conditions [27].

5. Conclusions

Although far from comprehensive and perfect, the four-capital model serves as a new and reasonable perspective and framework for SWB research. Inspired by Vemuri and Costanza [9] and Abdallah et al. [11], this paper employs the four-capital model to explain individual SWB of urban China. At least one indicator of built, human, social, and natural capital has significant positive impacts on individual SWB of urban China, which means that the four-capital model makes sense in explaining individual SWB of urban China. It can also be found that different dimensions and indicators of one certain type of capital may have different impacts on individual SWB of urban China. Therefore, we need to be more precise when we talk about the impacts of the four types of capital on individual SWB of urban China. The main contribution of this paper is to make a first attempt to test the four-capital model at the individual level and to provide a solid theoretical and empirical framework to discuss the possible determinants of individual SWB of urban China.
The regression estimations are based on a national cross-sectional dataset in 2013 and two regression methods are used to increase the robustness and validity of the estimation results. In the four-capital model, household income per capita, physical health, social connection, social trust and air quality have significant positive impacts on individual SWB of urban China, whereas individual income and education are not significantly related with individual SWB of urban China. The estimation results also demonstrate that household income per capita and physical health have almost the same and larger positive impacts and that social connection, social trust, and air quality have smaller and diminishing positive impacts on individual SWB of urban China.

The empirical findings give us thoughts and guidance on how to achieve human-centered urbanization for China. Household income per capita and other economic factors related to whole family members deserve to be paid more attention to make the urban residents more satisfied with their lives. In the process of making economic policies, households should be treated as basic units. Social security systems and healthcare systems in urban China need to be adapted and improved to guarantee that economics, time, and other costs of keeping and improving physical health are kept low. The governments, media, and non-governmental organizations should also make more effort in strengthening social connections and social trust, so as to make the whole of society more connected, honest, and friendly. For the new urban residents who immigrate from the rural areas of China, social connection and social trust are especially important for them to feel comfortable and satisfied with their lives in the urban areas. As for air quality, this is already a serious problem in urban China and the social media is full of various complaints about air pollution. The governments should monitor and reduce air pollution more effectively and promptly. The producers and consumers should also shoulder their respective responsibilities to make air quality around them better and better [39]. New economic patterns, such as the low carbon economy and the circular economy, are urgently needed to improve air quality and maintain other functions of natural capital.

Much more work needs to be done to improve our empirical estimations. Instrumental variables of the indicators of the four types of capital, which are significantly related to the indicators of the four types of capital but to not individual SWB, are useful for eliminating the impacts of potential endogeneity [25, 40]. Because the regression estimations are based on a cross-sectional dataset, the estimated relationships between the four types of capital and individual SWB of urban China cannot be interpreted as causal relationships, but only as conditional correlations. Regression estimations based on panel datasets are helpful for exploring the causal relationships between the four types of capital and individual SWB and for controlling for non-observable heterogeneity [20, 41]. Besides, more control variables, such as indicators of relative status and public services, can be included to help explain individual SWB.

Much more work can be conducted to deepen and expand our research. The insignificant indicators imply some stories between the four types of capital and individual SWB of urban China, which need exploration in future research. For example, it is a common sense that education is very important in one’s life in urban China, but why education is not statistically significant in the four-capital model? Or to say, why cannot education directly make the urban residents more satisfied with their lives? Barriers and factors, which make the urban residents in China with higher education levels not more satisfied with their lives, need to be explored in detail. To obtain more accurate and comprehensive estimations of the relationships between natural capital and individual SWB, more indicators of natural capital at the individual level need to be devised and employed. Strictly speaking, air quality only measures the sinks dimension of natural capital. We do not select indicators, which can measure the sources dimension of natural capital. If the indicators of both the sinks and sources dimensions of natural capital are significant with the expected signs in the four-capital model, the contribution of natural capital to improving human well-being at the individual level will become much more evident. This paper does not consider the distributions of the four types of capital among the 3293 individuals, which may provide new insights into the four-capital model in explaining individual SWB. What is more, employing the four-capital model to explain individual SWB of other
countries (regions) and testing the four-capital model on a larger scale are especially encouraged. More specific stories about the four-capital model are needed to verify its applicability at the individual level.

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