

Trust, Social Networks and Subjective Wellbeing in China

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Abstract Using data from the World Values Survey, this study examines the associations among trust, social networks and subjective wellbeing in China. We address the endogenous nature of trust and social networks, and examine how these elements of social capital affect subjective wellbeing. We also explore the interplay between trust and social networks. Existing literature suggests that trust and social networks positively impact wellbeing, with one strand of the literature suggesting that in developed countries social capital is a stronger determinant of wellbeing than income. However, we find that this is not the case for China (a developing country) where the effects of trust and social networks on wellbeing are found to be relatively weaker compared to the effect of income.

Keywords Trust · Social networks · Wellbeing · Social capital · China

1 Introduction

The importance of wellbeing is well recognised by academics, policy makers and governments, with existing studies attributing elements such as optimal health, healthy relationships and economic efficiency among others to an individual's wellbeing and quality of life. Sociologists and psychologists have long focused on the subject of wellbeing, with interest in its determinants in the economics literature traced to the early 1970s, starting with the work of Easterlin (1974). Based on individuals' self-reported data about life satisfaction (often referred to as subjective wellbeing), Easterlin examines the association

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between income and subjective wellbeing and reports that individuals with higher income tend to enjoy higher levels of wellbeing.

Easterlin's (1974) pioneering work has given rise to a relatively large literature on the determinants of subjective wellbeing, with different strands focusing on variations of these determinants. One such strand examines the impact of social capital on subjective wellbeing and reports a positive relationship (see e.g., Bjørnskov 2006, 2008; Helliwell 2003; Helliwell and Putnam 2004; Klein 2013; Pinquart and Sørensen 2000; Pugno 2009; Saracino 2010). Broadly defined in the literature, social capital has been linked with issues that include trust, social networks or social ties. Indeed, some research focuses on trust as the most important element of social capital and examines its impact on wellbeing (see, e.g., Bjørnskov 2003, 2008; Chang 2009; Helliwell 2003; Helliwell and Putnam 2004; Helliwell and Wang 2011; Ram 2010). Relatively less is known, however, about the effects of social networks on wellbeing; further, empirical evidence on the direction and strength of the effect of trust and social networks on wellbeing in the developing world is limited.

The primary objective of this paper, then, is to broaden our knowledge of the effects of trust and social networks on subjective wellbeing in the context of the developing world by examining data on China. Specifically, we address the question: what is the interplay among trust, social networks and wellbeing in China? Using data from the World Values Survey (WVS) on China, we also address the endogenous relationships among trust, social networks and wellbeing. While existing studies provide a clear overview of the interplay between trust and wellbeing, the potential endogeneity between trust and wellbeing as well as between social networks and wellbeing has not been considered to date. More specifically, there is a possibility of reverse causation between wellbeing and social capital, that is, people who report higher wellbeing are more trusting in nature, and people who are trusting in nature generally report higher wellbeing. This possibility also arises in various measures of social capital, that is, people who are trusting in nature are more likely to form social networks, and people who are engaged in social network are more likely to trust other people. Unless accounted for, these possibilities can give rise to endogeneity and have the potential to bias results.

In the current study we argue that, while trust and social networks affect wellbeing, it is likely that wellbeing could also affect trust and social networks. Consider an example in the context of social networks and wellbeing: it is likely that individuals with higher levels of life satisfaction would be more inclined to join certain social groups than those with lower levels of life satisfaction; however, it is also likely that individuals with lower levels of life satisfaction would be more inclined to join self-help groups. The bi-directional causal nature of this relationship thus raises concerns of endogeneity, which have not been resolved in the literature mainly due to difficulty in finding appropriate instrumental variables (IVs). The interplay between trust and social networks could be endogenous as well, as we would expect individuals with higher levels of trust to be more involved in social groups and vice versa. Given that OLS estimates could be biased in the presence of endogeneity, we thus use Lewbel (2012) heteroskedasticity adjusted instruments to control for potential endogeneity and as a robustness check to our main results.

Various justifications for using China data may be advanced. First, being the most populous country in the world as well as a developing country, very little is known about its determinants of wellbeing (Yip et al. 2007). Moreover, China is ethnically homogenous with a relatively low index of ethnic fractionalization compared to other countries such as the United States (Alesina et al. 2003; Alesina and Zhuravskaya 2011; Easterly and Levine 1997; Fearon 2003). Thus, it is expected that trust and social capital would be higher in China overall, given evidence from existing research that suggests that trust is lower in

more fractionalized areas (Alesina and Zhuravskaya 2011). Further, as China is believed to have a relatively slower pace of social transformation (Yip et al. 2007), this country makes for a unique case study.

Evidence presented for China in this context can therefore offer additional insights to other countries with similar cultural backgrounds, demographics and socioeconomic conditions. Furthermore, contrary to observations in other transitioning and developing economies, China has experienced significant economic development over the past few years despite being an economic and institutional environment that defies conventional economic theories (Boisot and Child 1996; Li 2004; Li et al. 2000; Nee 1992; Walder 1995; Wang et al. 2012). However, by observing social patterns and how these might affect wellbeing, this study aims to provide some insights into the phenomenon of high growth in China. With a relatively slower pace of social transformation in this country (Yip et al. 2007), it is worthwhile examining the extent to which these patterns of social transformation in terms of trust and social networks affect the wellbeing of its population.

Additionally, the use of a single country in our analysis mitigates some existing concerns regarding the use of life satisfaction indicators to measure wellbeing. It has been argued that such findings could be flawed given that life satisfaction might not have comparable meaning across different countries (Helliwell 2006). Given this concern, it makes sense to use one country.

In this current study, we contribute to existing literature in three ways. First, we examine the effects of social networks and trust on subjective wellbeing in China, and address the endogenous nature of this relationship. The implications of trust and social networks for wellbeing in the developing world have not received much attention, more so for China, which is a highly populous country with a unique social framework. Hence, we contribute to the existing literature by presenting a new perspective on the debate on the determinants of wellbeing. Second, we analyse the interplay between social networks and trust, and examine if trust affects social networks and vice versa. This relationship has not received much attention empirically, although theoretically it is argued that trust is a major element that promotes social networks, and that social networks encourage trust and cooperative behaviour. Put differently, findings from the existing literature are limited to association rather than causation; here we examine the latter. Third, we use a wider range of measures for trust and social networks than previous studies in this area. This allows us to examine the robustness of our results from different constructs of trust and social networks.

The remainder of the paper is structured as follows. Section 2 provides a brief overview of the literature on the determinants of wellbeing. Section 3 presents an overview of our data and variables, and the empirical framework. Section 4 presents our results, while Sect. 5 examines the robustness of these results. Section 6 presents a brief discussion and conclusion.

2 Brief Overview of Relevant Literature

In any social setting, trust and social networks are considered essential elements (Helliwell and Wang 2011); hence, the potential for these social constructs to affect outcomes such as economic growth, health and education has been widely studied. Thus, numerous studies have attempted to understand the implications and benefits of social capital, which it is argued include trust, social ties and networks. In particular, social capital is understood to

be a resource derived from social networks or ties (Coleman 1988; Morrow 1999), with trust considered to be a major component of this resource as it plays a significant role in promoting elements such as social networks and ties (Uslaner 1999). Given this, while research has provided various definitions for social capital (see, e.g., Coleman 1988; Field 2003; Jack and Jordan 1999; Onyx and Bullen 2000; Portes 1998, 2000), a common consensus in the literature is that social networks and trust form part of an individual's social capital.

Since the pioneering work by Banfield (1958) and subsequently Coleman (1990), and Putnam (2000), trust has been considered a key determinant of several economic and social outcomes. Trust is broadly defined as an attitude of cooperativeness outside an individual's family cycle that has the potential to influence various outcomes. Clearly the implications of trust cut across various facets, including economic development and business growth; indeed, Arrow (1972) asserts that every successful transaction is based on an element of trust and that a lack of mutual confidence or trust explains much of the economic backwardness in the world. The logic here suggests that the enforcement of contracts, whether formal or informal, largely hinges on trust, and that in its absence markets cease to be efficient and economic exchanges are affected. Accordingly, the social construct of trust that underpins the quality of cooperation could affect various outcomes.

The availability of survey data such as the European Values Survey (EVS) and the World Values Survey (WVS) has made it relatively easier to examine the determinants of less tangible outcomes such as subjective wellbeing. Considering social capital as a broad framework that includes trust and social ties, several studies have confirmed a significant association between social capital and subjective wellbeing or life satisfaction, and in most cases evidence suggests a positive association (see, e.g., Bjørnskov 2003; Elgar et al. 2011; Helliwell 2003; Helliwell and Putnam 2004; Helliwell and Wang 2011). In fact, some studies argue that social capital may be a relatively stronger determinant of wellbeing and life satisfaction than well-known determinants such as income (see, e.g., Bjørnskov 2003).

A basic explanation offered in the literature suggests that social relationships are valuable and can make people happy, thus increasing their overall life satisfaction. Further, good social relationships built upon trust have the potential to avert stress and psychological deprivation (Biswas-Diener and Diener 2006). Social support in particular may be a source of wellbeing, as it can both influence the coping process of stress and provide information on how to avoid various problems that could negatively influence wellbeing (Pinquart and Sörensen 2000).

Cox (2000) also offers an explanation that provides further insight into why social capital impacts wellbeing, that is, the benefits of social networks come into play when individuals have to deal with conflicts and problems. The logic here suggests that social networks promote social capital, and that those communities/individuals with high levels of social capital will better manage conflicts. Given that conflicts negatively influence wellbeing (Sonntag et al. 2013), it can be argued that the effect of social capital (in which social networks are implicated) on wellbeing is a result of the potential role that social capital plays in mitigating conflicts or managing them adequately. In these terms, then, social networks can be useful in situations where individuals might be reluctant to cooperate or come together to resolve conflict.

However, from an alternative perspective, the possibility of social networks negatively affecting wellbeing has also been conceptualized in some literature, where it is argued that social relationships may strain an individual's resources and thus may carry negative consequences. When this happens, life satisfaction or wellbeing may be undermined (e.g., Ingersoll-Dayton et al. 1997). Overall, however, it is expected that an individual's quality

of life can be predicted by the levels of social connection that inherently influence various facets of that individual's life.

Other studies in the field examine social capital as a determinant of wellbeing while exploring the variations in demographics. For instance, Elgar et al.'s (2011) findings suggest that social capital is a stronger determinant of subjective wellbeing for women than for men, as well as for older adults rather than for the young. It has also been argued that an individual's social capital has a spill-over effect, that is, it has the potential to increase life satisfaction of other individuals in a neighbourhood (Helliwell 2003).

In sum, the existing literature hypothesizes a relationship between social capital and subjective wellbeing, and evidence points to the positive effect of social capital. While various proxies for social capital have been argued in the literature, two major measures used in extant research include social ties (Helliwell and Putnam 2004) as well as generalized social trust, which has been used for both macro-level and micro-level studies (see, e.g., Helliwell 2003, 2006; Helliwell and Putnam 2004; Inglehart and Klingemann 2009; Sarracino 2010; Uslaner 1999). In this study, we contribute to the literature by exploring a wider range of measures that capture social capital, especially various measures of trust and social networks. Our choice of sample (i.e., data from China), also adds a unique perspective to the literature and debates on the effects of social capital, as how these effects play out in the developing world has not been explored adequately to this point.

3 Data and Empirical Specification

Our data comes from the second to sixth waves of the World Values Survey (WVS). The WVS consists of nationally representative surveys conducted in about 100 countries based on questionnaires designed to capture changing social values and their impact on several socioeconomic and political outcomes. Data from the WVS database are widely regarded as reliable and have produced over 400 publications globally.¹ The first wave of the WVS was launched in 1981 followed by five subsequent waves. The sixth wave, which is currently the latest, was launched in 2010. Owing to data availability issues, however, we use only five waves of data, that is, the second to sixth waves.

3.1 Measures

3.1.1 *Dependent Variable*

Our dependent variable is self-reported subjective wellbeing. This measure of subjective wellbeing is consistent with existing literature and can be defined as an individual's positive evaluation of his/her life with regard to good feeling or satisfaction (Pinquart and Sørensen 2000). The literature presents several ways to measure subjective wellbeing, that is, through perceptions of self-esteem, life satisfaction and happiness (Kozma et al. 1991; Pinquart and Sørensen 2000; Rosenberg 1979). Given the data at hand, we focus on life satisfaction. The WVS provides information on respondents' satisfaction with life through their answers to this question: "All things considered, how satisfied are you with your life as a whole these days? 1 means you are "completely dissatisfied" and 10 means you are "completely satisfied"; where would you put your satisfaction with your life as a whole?"

¹ For details on the WVS data, see www.worldvaluessurvey.org.

3.1.2 Independent Variables

In terms of social capital, the empirical literature shows great diversity in how its variables are defined. This is mainly because of the variations in the definitions of social capital. In this study, we draw on Putnam's (2000, p. 19) definition to derive our measure of social capital, that is, "social capital refers to connections among individuals—social networks and the norms of reciprocity and trustworthiness that arise from them."

For our first measure of social capital, we attempt to capture social networks and therefore use the level of individual involvement in social groups as our measure. The WVS asks questions relating to the involvement of respondents in various groups. Our measure of social capital (social network) is a dummy variable that captures respondents who belong to various groups. Specifically, we have seven measures of social network. The first captures respondents who belong to a religious group (*social network 1*), the second captures respondents who belong to a sports group (*social network 2*), the third, fourth, fifth and sixth capture respondents in educational groups (*social network 3*), political parties (*social network 4*), professional organizations (*social network 5*), and self-help groups (*social network 6*), respectively. To capture the various dimensions simultaneously, we also include a seventh measure, that is, the average of all six measures of social network. It is anticipated that an individual who is more socially connected will have a higher value for this average variable compared to an individual who is less socially connected.

Research into the effects of trust essentially focuses on applying a measure of generalized trust. In this context, trust is perceived as a relation among individuals outside of the same family. Thus, trust is an attitude of cooperativeness that goes beyond the kind of personal ties that bind members of the same family. However, we go further than the often-used measure of generalized trust and explore six other measures including trust for family, neighbour, strangers, people from other religions and people of other nationalities, as well as one overall measure of trust that is the average of the individual measures of trust used.

Our measure of generalized trust (*Trust 1*) is drawn from the WVS question: "generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" Respondents are coded as trusting if they agreed with the statement that most people could be trusted. Other measures of trust (*Trust 2* to *Trust 7*) are based on questions regarding whether or not respondents trust certain categories of people. Here, we capture trust for family (*Trust 2*), trust for neighbour (*Trust 3*), trust for people known by respondent (*Trust 4*), trust for strangers (*Trust 5*), trust for people from other religions (*Trust 6*), and trust for people of other nationalities (*Trust 7*). These measures of trust are dummy variables and, in the case of *Trust 2* to *Trust 7*, dummy variables are one if respondent agree they trust people in each category. Our overall measure of trust (*Trust*) takes the average value of all seven measures of trust.

3.1.3 Other Control Variables

Consistent with the existing literature we also control for other relevant factors that have been associated with a person's quality of life or wellbeing: income, gender, marital status, age, unemployment, religion, and other family and community relations (see, e.g., Biswas-Diener and Diener 2006; Camfield et al. 2006; Diener 2009; Diener et al. 2009; Helliwell and Putnam 2004; Helliwell and Wang 2011).

Our measure of income is an income scale that reflects 10 income categories, with 1 representing the lowest income group and 10 the highest income group in China. For gender, marital status and unemployment, we include a dummy variable for respondents who are male, married and unemployed, respectively. We also control for the age of respondents and a quadratic term of age.

We also control for the level of freedom perceived by respondents (*freedom*). Here, the WVS asks the question: “how much freedom of choice and control do you have over your life?” where 1 means “no choice and control at all” and 10 means “a great deal of choice and control.” Other control variables capture the importance of religion to the respondent, as well as financial freedom and fear. With regard to religion, the WVS asks if religion is important to respondents, and we code respondents who agree that religion is important as one. For financial freedom, dummy variable equals one if a respondent has in the past gone without money to afford basic needs (*money*). We also code variables that capture respondents’ fear of or worry about terrorist attack and civil war, and also whether

Table 1 Summary statistics

Variable	Observations	Mean	SD
Wellbeing	6731	6.87	2.26
Trust	6731	0.29	0.25
Trust 1	6731	0.56	0.50
Trust 2	6731	0.49	0.50
Trust 3	6731	0.42	0.49
Trust 4	6731	0.39	0.48
Trust 5	6731	0.05	0.23
Trust 6	6731	0.05	0.22
Trust 7	6731	0.04	0.21
Social network	6731	0.45	0.39
Social network 1	6731	0.53	0.50
Social network 2	6731	0.38	0.49
Social network 3	6731	0.36	0.48
Social network 4	6731	0.37	0.48
Social network 5	6731	0.32	0.46
Social network 6	6731	0.72	0.45
Income	6731	4.45	2.02
Male	6731	0.52	0.49
Married	6731	0.83	0.38
Unemployed	6731	0.03	0.16
Age	6731	41.56	13.88
Age squared	6731	19.19	12.31
Freedom	6731	7.09	2.31
Money	6731	0.83	0.38
Unsafe	6731	0.82	0.38
Help	6731	0.98	0.13
Religion	6731	0.11	0.32
Terrorism	6731	0.12	0.32
Civil war	6731	0.11	0.31

Table 2 Overview of survey waves

Wave	Year survey was conducted	Number of observations
Wave 2	1990–1994	973
Wave 3	1995–1998	1451
Wave 4	1999–2004	892
Wave 5	2005–2009	1482
Wave 6	2010–2014	1933

respondents have felt unsafe from crime in the past (*unsafe*). Lastly, we include a dummy variable that captures whether or not it is important for a respondent to help people nearby.

In order to control for province-fixed effects we also include province dummies. Our dataset includes data on 29 provinces, which are reported in the “Appendix”. We include a dummy for all except six provinces (Heilongjiang, Inner Mongolia, Tianjin, Tibet, Xinjiang and Yunnan), which are coded as reference category. We also control for the various waves, and thus include dummies for waves 3–6, using wave 2 as the reference category. Table 1 presents a summary statistics of these variables, while Table 2 presents an overview of each survey wave and observations under each wave of survey used for our analysis. Table 13 in the “Appendix” presents a list and description of variables used in the analysis, while Table 14 presents a list of provinces covered in the analysis.

3.2 Empirical Specification

In order to examine the impact of trust and social networks on subjective wellbeing, we estimate the following equation:

$$WB_i = \alpha + \sum_m \gamma_m T_{m,i} + \sum_n \beta_n X_{n,i} + \varepsilon_i$$

where i indexes the individuals, WB is the measure of subjective wellbeing, T_m is a vector of our main explanatory variables (i.e., trust and social networks), X_n is a set of control variables described earlier, γ_m and β_n are parameters to be estimated, and ε is the random error term.

4 Results

4.1 Effects of Trust and Social Networks on Wellbeing

Tables 3 and 4 present results for the association between trust and wellbeing, and social networks and wellbeing, respectively. In Table 3, each of the seven columns provides alternate estimations for subjective wellbeing using different measures of trust. Columns 1–7, respectively, present results using *Trust 1* to *Trust 7* as described earlier. Similarly, in Table 4, each of the columns provides alternate estimations for subjective wellbeing using different measures of social network. Columns 1–6 present results for *social network 1* to *social network 6*, respectively.

Overall, from Table 3, we find a positive effect of trust on subjective wellbeing, and this result is consistent across all measures of trust. From column 1, we find that the coefficient

Table 3 Trust and wellbeing (OLS robust regressions)

Variables	Trust 1 (1)	Trust 2 (2)	Trust 3 (3)	Trust 4 (4)	Trust 5 (5)	Trust 6 (6)	Trust 7 (7)
Trust	0.29*** (0.05) [0.06]	0.50** (0.23) [0.11]	0.23** (0.09) [0.05]	0.20** (0.08) [0.04]	0.27** (0.11) [0.03]	0.25** (0.11) [0.02]	0.33*** (0.11) [0.03]
Income	0.25*** (0.01)	0.25*** (0.02)	0.25*** (0.01)	0.25*** (0.01)	0.25*** (0.01)	0.25*** (0.01)	0.25*** (0.01)
Male	-0.15*** (0.05)	-0.15*** (0.05)	-0.15*** (0.05)	-0.15*** (0.05)	-0.15*** (0.05)	-0.15*** (0.05)	-0.15*** (0.05)
Married	0.37*** (0.08)	0.37*** (0.08)	0.37*** (0.08)	0.38*** (0.08)	0.37*** (0.08)	0.37*** (0.08)	0.37*** (0.08)
Unemployed	0.00 (0.17)	-0.02 (0.17)	-0.00 (0.17)	-0.01 (0.17)	-0.01 (0.17)	-0.01 (0.17)	-0.01 (0.17)
Age	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)
Age squared	0*** (0.01)	0.08*** (0.01)	0.08*** (0.01)	0.08*** (0.01)	0.08*** (0.01)	0.08*** (0.01)	0.08*** (0.01)
Freedom	0.36*** (0.01)	0.36*** (0.01)	0.36*** (0.01)	0.36*** (0.01)	0.36*** (0.01)	0.36*** (0.01)	0.36*** (0.01)
Money	-0.22** (0.11)	-0.21* (0.11)	-0.21* (0.11)	-0.22** (0.11)	-0.21* (0.11)	-0.20* (0.11)	-0.20* (0.11)
Unsafe	-0.25** (0.11)	-0.26** (0.11)	-0.25** (0.11)	-0.26** (0.11)	-0.26** (0.11)	-0.27** (0.11)	-0.27** (0.11)
Help	0.15 (0.20)	0.14 (0.20)	0.14 (0.20)	0.13 (0.20)	0.15 (0.20)	0.14 (0.20)	0.15 (0.20)
Religion	0.04 (0.09)	0.04 (0.09)	0.03 (0.09)	0.04 (0.09)	0.03 (0.09)	0.01 (0.09)	0.02 (0.09)
Terrorism	0.02 (0.14)	0.00 (0.14)	0.01 (0.14)	-0.01 (0.14)	0.01 (0.14)	0.00 (0.14)	-0.01 (0.14)
Civil war	0.05 (0.14)	0.05 (0.14)	0.04 (0.14)	0.07 (0.14)	0.04 (0.14)	0.05 (0.14)	0.06 (0.14)
Constant	4.98*** (0.36)	5.12*** (0.36)	5.15*** (0.36)	5.16*** (0.36)	5.13*** (0.36)	5.13*** (0.36)	5.12*** (0.36)
Waves dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6731	6731	6731	6731	6731	6731	6731
R-squared	0.25	0.24	0.24	0.24	0.24	0.24	0.24

Robust standard errors in parentheses

Standardized coefficients in brackets

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

on the “people can be trusted” question (*Trust 1*) is 0.29, implying a 0.29 higher individual life satisfaction, on a scale of 1–10, if respondents thought people could be trusted. Here, a standard deviation increase in trust is associated with an increase of 0.06 standard

Table 4 Social network and wellbeing (OLS robust regressions)

Variables	Network 1 (1)	Network 2 (2)	Network 3 (3)	Network 4 (4)	Network 5 (5)	Network 6 (6)
Social network	0.10 (0.15) [0.02]	0.33*** (0.08) [0.07]	0.25*** (0.09) [0.05]	0.22*** (0.08) [0.05]	0.26** (0.12) [0.05]	0.40* (0.21) [0.08]
Income	0.25*** (0.02)	0.25*** (0.02)	0.25*** (0.02)	0.25*** (0.02)	0.25*** (0.02)	0.25*** (0.01)
Male	-0.15*** (0.05)	-0.15*** (0.05)	-0.15*** (0.05)	-0.16*** (0.05)	-0.15*** (0.05)	-0.15*** (0.05)
Married	0.37*** (0.08)	0.39*** (0.08)	0.38*** (0.08)	0.38*** (0.08)	0.37*** (0.08)	0.37*** (0.08)
Unemployed	-0.02 (0.17)	-0.02 (0.17)	-0.01 (0.17)	-0.02 (0.17)	-0.02 (0.17)	-0.02 (0.17)
Age	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)
Age squared	0.08*** (0.01)	0.08*** (0.01)	0.08*** (0.01)	0.08*** (0.01)	0.08*** (0.01)	0.08*** (0.01)
Freedom	0.36*** (0.01)	0.36*** (0.01)	0.36*** (0.01)	0.36*** (0.01)	0.36*** (0.01)	0.36*** (0.01)
Money	-0.21* (0.11)	-0.23** (0.11)	-0.22** (0.11)	-0.21* (0.11)	-0.21* (0.11)	-0.21* (0.11)
Unsafe	-0.27** (0.11)	-0.27** (0.11)	-0.27** (0.11)	-0.28** (0.11)	-0.27** (0.11)	-0.27** (0.11)
Help	0.15 (0.20)	0.13 (0.20)	0.14 (0.20)	0.14 (0.20)	0.14 (0.20)	0.16 (0.20)
Religion	0.01 (0.09)	0.02 (0.09)	0.02 (0.09)	0.03 (0.09)	0.03 (0.09)	0.03 (0.09)
Terrorism	0.01 (0.14)	0.01 (0.14)	0.00 (0.14)	-0.00 (0.14)	0.00 (0.14)	0.01 (0.14)
Civil war	0.05 (0.14)	0.04 (0.14)	0.05 (0.14)	0.06 (0.14)	0.06 (0.14)	0.05 (0.14)
Constant	5.04*** (0.39)	4.80*** (0.37)	4.89*** (0.37)	4.93*** (0.37)	4.88*** (0.38)	4.74*** (0.42)
Waves dummies	Yes	Yes	Yes	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6731	6731	6731	6731	6731	6731
R-squared	0.24	0.25	0.24	0.24	0.24	0.24

Robust standard errors in parentheses

Standardized coefficients in brackets

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

deviations in subjective wellbeing. From column 2, the coefficient on trust is 0.50, which suggests a 0.50 higher individual life satisfaction if respondents trust their families. In terms of standard deviations, a standard deviation increase in trust is associated with an

Table 5 Trust, social network and wellbeing (OLS robust regressions)

Variables	Wellbeing (1)	Wellbeing (2)	Wellbeing (3)
Trust	1.18*** (0.19) [0.13]		1.16*** (0.19) [0.13]
Social network		0.69*** (0.17) [0.12]	0.65*** (0.17) [0.11]
Income	0.25*** (0.01)	0.25*** (0.02)	0.24*** (0.02)
Male	-0.15*** (0.05)	-0.16*** (0.05)	-0.16*** (0.05)
Married	0.37*** (0.08)	0.39*** (0.08)	0.38*** (0.08)
Unemployed	0.01 (0.17)	-0.01 (0.17)	0.02 (0.17)
Age	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)
Age squared	0.08*** (0.01)	0.08*** (0.01)	0.07*** (0.01)
Freedom	0.36*** (0.01)	0.36*** (0.01)	0.36*** (0.01)
Money	-0.22** (0.11)	-0.23** (0.11)	-0.23** (0.11)
Unsafe	-0.22** (0.11)	-0.28** (0.11)	-0.22** (0.11)
Help	0.12 (0.20)	0.13 (0.20)	0.11 (0.20)
Religion	0.01 (0.09)	-0.01 (0.09)	-0.03 (0.09)
Terrorism	0.00 (0.14)	-0.00 (0.14)	-0.01 (0.14)
Civil war	0.05 (0.14)	0.05 (0.14)	0.04 (0.14)
Constant	5.04*** (0.36)	4.45*** (0.40)	4.40*** (0.40)
Waves dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Observations	6731	6731	6731
R-squared	0.25	0.25	0.25

Robust standard errors in parentheses

Standardized coefficients in brackets

*** $p < 0.01$; ** $p < 0.05$;

* $p < 0.1$

increase of 0.11 standard deviations in subjective wellbeing. Similarly, the coefficients of trust in columns 3–7 are 0.23, 0.20, 0.27, 0.25 and 0.33, respectively, implying that on a scale of 1–10, individual life satisfaction increases by 0.23 if respondents trust their neighbours, 0.20 if respondents trust people they know, 0.27 if respondents trust strangers,

0.25 if respondents trust people from other religions, and 0.33 if respondents trust people from other nationalities. For these measures of trust (shown in columns 3–7), the standardized coefficients range from 0.2 to 0.5. Hence, for the strongest effect (column 3), a standard deviation increase in trust is associated with an increase of 0.05 standard deviations in wellbeing.

Turning to the results on social networks (Table 4), we find that social networks are also positively associated with wellbeing, and this is consistent across all measures of social networks but one. Specifically, we find that belonging to a religious organization in China does not contribute to an individual's wellbeing or life satisfaction. However, from column 2, we note a coefficient of 0.33 on social networks, implying a 0.33 higher individual life satisfaction, on a scale of 1–10, if respondent belongs to a sports group. The reported standardized coefficients here show that a standard deviation increase in social networks is associated with an increase of 0.07 standard deviations in wellbeing. Similarly, belonging to educational, political, professional or self-help groups, respectively, is associated with a 0.25, 0.22, 0.26 or 0.40 higher individual life satisfaction. Here, a standard deviation increase in social networks (measured by membership in educational, political or professional groups) is associated with an increase of 0.05 standard deviations in subjective wellbeing. Also, a standard deviation increase in social networks (measured by membership in a self-help group) is associated with an increase of 0.08 standard deviations in wellbeing.

In Table 5, which presents results for our averaged measures of trust and social network, we find that the observed effects on wellbeing have not changed. Here, column 1 presents results for the association between our overall measure of trust and wellbeing, while column 2 replaces our measure of trust with the overall measure of social network. Column 3 presents results where both trust and social network are included in the same regression.

From column 1, we find that the coefficient on trust is 1.18; thus, trust is associated with a 1.18 higher life satisfaction on a scale of 1–10. In this case, a standard deviation increase in trust is associated with an increase of 0.13 standard deviations in subjective wellbeing. From column 2, the coefficient on social network is 0.69, which implies that involvement in social networks is associated with a 0.69 higher individual life satisfaction, or that a standard deviation increase in social network participation is associated with an increase of 0.12 standard deviations in subjective wellbeing. Lastly, the coefficients of trust and social network in column 3 are similar to those reported in columns 1 and 2. Specifically, the coefficients on trust and social network are reported as 1.16 and 0.65, respectively.

Compared to other control variables, we find that the effects of trust and social network on subjective wellbeing are relatively weaker than the effects of control variables such as income and age on wellbeing. However, compared to control variables such as *marital status*, *money*, *freedom* and *unsafe*, we find that the effect of trust and social network are relatively stronger. The control variables reveal that income and freedom are positively associated with subjective wellbeing. Thus, respondents with higher levels of income tend to report higher wellbeing, and this is also the case for the level of choice and freedom perceived by respondents. Results also show that married respondents tend to report higher levels of life satisfaction as opposed to those who are single or divorced.

Male respondent tend to report lower life satisfaction compared to female respondents. Further, while results show that age is negatively associated with wellbeing, this is not the case in the quadratic term. Also, feeling unsafe because of crime and lack of financial freedom are negatively associated with wellbeing. All other control variables are statistically insignificant.

The age effect observed in this study is consistent with the existing literature where significant negative effects are reported on age and positive effects on the age-squared variable (see, e.g., Helliwell and Wang 2011). Across our various specifications, we quite consistently find a U-shaped relationship with a low point of the U-shape in life satisfaction at about age 38.

We also included provincial dummies in our regressions to control for the effect of region specific, unobserved cultural factors. The majority of regional dummies were insignificant, suggesting that for most of the provinces there is no measurable difference in the trust–wellbeing relation or social network–wellbeing relation compared to the control group. However, the provincial dummies were positive and significant at 5 % level or higher for provinces Shanxi, Anhui, Shandong, Hunan, Shaanxi and Gansu, suggesting a stronger relation compared to the overall average. These results indicate that the magnitude of the relationship between trust–wellbeing and social network–wellbeing differs from one province to another owing to unobservable cultural differences. Hence, the coefficients presented in Tables 3 and 4 can be considered as the baseline estimate for China overall.

4.2 Interplay Between Trust and Social Network

In this section we report on the association between social network and trust. Column 1 of Table 6 reports on the effect of trust on social network, while column 2 reports on the effect of social network on trust. We use the mean measures of trust and social network in these regressions.

Results show a positive association between trust and social network. In both columns 1 and 2, we report a coefficient of 0.04 on both trust and social network. Turning to the standardized coefficients, we find that a standard deviation increase in trust is associated with a 0.03 standard deviation increase in the involvement of social networks. On the other hand, a standard deviation increase in individual involvement in social networks is associated with an increase of 0.06 standard deviations in trust. Thus, just as trust motivates people to join social networks, people who join social networks also develop more trust.

4.3 Endogeneity

Lewbel (2012) proposes a new methodology to identify the structural parameters in models with endogenous regressors. This methodology is particularly useful for applications where other sources of identification such as instrumental variables are either not available or very weak. A precondition for identification is the uncorrelatedness of regressors with the heteroskedasticity errors, which is often a standard feature in many models where the error correlations are due to unobserved common factors. Therefore, as long as there is some heteroskedasticity in the data, one can achieve the identification using this method. This methodology can be briefly explained as follows.

In the context of our current study, one could argue that some individuals live in a social environment that fosters better trust or networking among its members, and this could partly explain high scores of reported subjective wellbeing for such individuals. On the other hand, the unobserved social factors that promote individuals wellbeing are also responsible for higher reported levels of trust for individuals.

The resulting estimation problem in the context of current study can be summarised as:

$$WB_i = \alpha + X'_i\beta_1 + T_i\gamma_1 + \epsilon_1 \quad \epsilon_1 = \alpha_1 U + V_1 \quad (1)$$

Table 6 Interplay between trust and network (OLS robust regressions)

Variables	Social network (1)	Trust (2)
Trust	0.04*** (0.02) [0.03]	
Social network		0.04*** (0.01) [0.06]
Income	0.01*** (0.00)	0.00 (0.00)
Male	0.01*** (0.00)	0.00 (0.00)
Married	-0.02*** (0.01)	0.00 (0.01)
Unemployed	-0.01 (0.01)	-0.03** (0.01)
Age	-0.00*** (0.00)	-0.00 (0.00)
Age squared	0.00** (0.00)	0.00* (0.00)
Freedom	0.00*** (0.00)	0.00*** (0.00)
Money	0.04*** (0.01)	0.01 (0.01)
Unsafe	0.02*** (0.01)	-0.04*** (0.01)
Help	0.02 (0.02)	0.02 (0.02)
Religion	0.06*** (0.01)	0.02*** (0.01)
Terrorism	0.01 (0.01)	0.00 (0.02)
Civil war	-0.00 (0.01)	0.01 (0.02)
Constant	0.97*** (0.03)	0.04 (0.03)
Waves dummies	Yes	Yes
Province dummies	Yes	Yes
Observations	6731	6731
R-squared	0.88	0.71

Robust standard errors in parentheses

Standardized coefficients in brackets

*** $p < 0.01$; ** $p < 0.05$;

* $p < 0.1$

$$T_i = X' \beta_2 + \epsilon_2 \quad \epsilon_2 = \alpha_2 U + V_2 \quad (2)$$

such that WB_i is an individual's subjective wellbeing and T_i is an individual's reported level of trust or social networking in the above equation. U denotes the individual's

Table 7 Trust and wellbeing (Lewbel 2SLS regressions)

Variables	Trust 1 (1)	Trust 2 (2)	Trust 3 (3)	Trust 4 (4)	Trust 5 (5)	Trust 6 (6)	Trust 7 (7)
Trust	1.14 (0.71) [0.25]	0.49** (0.23) [0.11]	0.21** (0.09) [0.05]	0.20** (0.08) [0.04]	0.25** (0.11) [0.03]	0.22** (0.11) [0.02]	0.31*** (0.12) [0.03]
Income	0.25*** (0.02)	0.25*** (0.02)	0.25*** (0.01)	0.25*** (0.01)	0.25*** (0.01)	0.25*** (0.01)	0.25*** (0.01)
Male	-0.14*** (0.05)	-0.15*** (0.05)	-0.15*** (0.05)	-0.15*** (0.05)	-0.15*** (0.05)	-0.15*** (0.05)	-0.15*** (0.05)
Married	0.36*** (0.08)	0.37*** (0.08)	0.37*** (0.08)	0.38*** (0.08)	0.37*** (0.08)	0.37*** (0.08)	0.37*** (0.08)
Unemployed	0.05 (0.17)	-0.02 (0.17)	-0.00 (0.17)	-0.01 (0.17)	-0.01 (0.17)	-0.01 (0.17)	-0.01 (0.17)
Age	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)
Age squared	0.07*** (0.01)	0.08*** (0.01)	0.08*** (0.01)	0.08*** (0.01)	0.08*** (0.01)	0.08*** (0.01)	0.08*** (0.01)
Freedom	0.35*** (0.02)	0.36*** (0.01)	0.36*** (0.01)	0.36*** (0.01)	0.36*** (0.01)	0.36*** (0.01)	0.36*** (0.01)
Money	-0.25** (0.11)	-0.21* (0.11)	-0.21* (0.11)	-0.22* (0.11)	-0.21* (0.11)	-0.20* (0.11)	-0.20* (0.11)
Unsafe	-0.19 (0.12)	-0.26** (0.11)	-0.25** (0.11)	-0.26** (0.11)	-0.26** (0.11)	-0.27** (0.11)	-0.27** (0.11)
Help	0.15 (0.20)	0.14 (0.20)	0.14 (0.20)	0.13 (0.20)	0.15 (0.20)	0.14 (0.20)	0.15 (0.20)
Religion	0.06 (0.09)	0.04 (0.09)	0.03 (0.09)	0.04 (0.09)	0.03 (0.09)	0.01 (0.09)	0.02 (0.09)
Terrorism	0.06 (0.15)	0.00 (0.14)	0.01 (0.14)	-0.01 (0.14)	0.01 (0.14)	0.00 (0.14)	-0.00 (0.14)
Civil war	0.02 (0.15)	0.05 (0.14)	0.04 (0.14)	0.07 (0.14)	0.04 (0.14)	0.05 (0.14)	0.06 (0.14)
Constant	4.49*** (0.54)	5.12*** (0.36)	5.15*** (0.36)	5.16*** (0.36)	5.13*** (0.36)	5.13*** (0.36)	5.12*** (0.36)
Waves dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6731	6731	6731	6731	6731	6731	6731
R-squared	0.21	0.24	0.24	0.24	0.24	0.24	0.24

Robust standard errors in parentheses

Standardized coefficients in brackets

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

unobserved social environment that affects both his trust and social networks, and his subjective wellbeing. V_1 and V_2 are idiosyncratic errors. X' is a vector of controls variables.

Table 8 Social network and wellbeing (Lewbel 2SLS regressions)

Variables	Network 1 (1)	Network 2 (2)	Network 3 (3)	Network 4 (4)	Network 5 (5)	Network 6 (6)
Social network	0.08 (0.15) [0.02]	0.23*** (0.08) [0.05]	0.09 (0.09) [0.02]	0.20** (0.09) [0.04]	0.17 (0.13) [0.04]	0.46** (0.22) [0.09]
Income	0.25*** (0.02)	0.25*** (0.02)	0.25*** (0.02)	0.25*** (0.02)	0.25*** (0.02)	0.25*** (0.01)
Male	-0.15*** (0.05)	-0.15*** (0.05)	-0.15*** (0.05)	-0.16*** (0.05)	-0.15*** (0.05)	-0.15*** (0.05)
Married	0.37*** (0.08)	0.38*** (0.08)	0.37*** (0.08)	0.38*** (0.08)	0.37*** (0.08)	0.37*** (0.08)
Unemployed	-0.02 (0.17)	-0.02 (0.17)	-0.01 (0.17)	-0.02 (0.17)	-0.02 (0.17)	-0.02 (0.17)
Age	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)
Age squared	0.08*** (0.01)	0.08*** (0.01)	0.08*** (0.01)	0.08*** (0.01)	0.08*** (0.01)	0.08*** (0.01)
Freedom	0.36*** (0.01)	0.36*** (0.01)	0.36*** (0.01)	0.36*** (0.01)	0.36*** (0.01)	0.36*** (0.01)
Money	-0.21* (0.11)	-0.22** (0.11)	-0.21* (0.11)	-0.21* (0.11)	-0.21* (0.11)	-0.21* (0.11)
Unsafe	-0.27** (0.11)	-0.27** (0.11)	-0.27** (0.11)	-0.28** (0.11)	-0.27** (0.11)	-0.27** (0.11)
Help	0.15 (0.20)	0.14 (0.20)	0.14 (0.20)	0.14 (0.20)	0.15 (0.20)	0.16 (0.20)
Religion	0.02 (0.09)	0.02 (0.09)	0.03 (0.09)	0.03 (0.09)	0.03 (0.09)	0.03 (0.09)
Terrorism	0.01 (0.14)	0.01 (0.14)	0.00 (0.14)	-0.00 (0.14)	0.00 (0.14)	0.01 (0.14)
Civil war	0.05 (0.14)	0.05 (0.14)	0.05 (0.14)	0.06 (0.14)	0.06 (0.14)	0.05 (0.14)
Constant	5.06*** (0.39)	4.90*** (0.37)	5.05*** (0.37)	4.95*** (0.37)	4.97*** (0.38)	4.68*** (0.42)
Waves dummies	Yes	Yes	Yes	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6731	6731	6731	6731	6731	6731
R-squared	0.24	0.25	0.24	0.24	0.24	0.24

Robust standard errors in parentheses

Standardized coefficients in brackets

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Clearly, some of the structural parameters of above equations are not identifiable without additional information. Generally one obtains the identification either by (1) imposing equality constraints on the coefficients of X (i.e., OLS regression), or (2)

Table 9 Trust, social network and wellbeing (Lewbel 2SLS regressions)

Variables	Wellbeing (1)	Wellbeing (2)	Wellbeing (3)
Trust	0.76*** (0.26) [0.08]		0.78*** (0.26) [0.08]
Social network		0.69*** (0.17) [0.12]	0.66*** (0.17) [0.11]
Income	0.25*** (0.01)	0.25*** (0.02)	0.24*** (0.02)
Male	-0.15*** (0.05)	-0.16*** (0.05)	-0.16*** (0.05)
Married	0.37*** (0.08)	0.39*** (0.08)	0.39*** (0.08)
Unemployed	0.00 (0.17)	-0.01 (0.17)	0.01 (0.17)
Age	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)
Age squared	0.08*** (0.01)	0.08*** (0.01)	0.07*** (0.01)
Freedom	0.36*** (0.01)	0.36*** (0.01)	0.36*** (0.01)
Money	-0.21* (0.11)	-0.23** (0.11)	-0.23** (0.11)
Unsafe	-0.24** (0.11)	-0.28** (0.11)	-0.24** (0.11)
Help	0.13 (0.20)	0.13 (0.20)	0.12 (0.20)
Religion	0.02 (0.09)	-0.01 (0.09)	-0.02 (0.09)
Terrorism	0.00 (0.14)	-0.00 (0.14)	-0.00 (0.14)
Civil war	0.05 (0.14)	0.05 (0.14)	0.05 (0.14)
Constant	5.07*** (0.36)	4.45*** (0.40)	4.41*** (0.40)
Waves dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Observations	6731	6731	6731
R-squared	0.25	0.25	0.25

Robust standard errors in parentheses

Standardized coefficients in brackets

*** $p < 0.01$; ** $p < 0.05$;

* $p < 0.1$

assuming that one or more elements of β_1 equal to zero. This permits the estimation of WB_i equation using two-stage least squares with instruments X. (i.e., IV regression).

However, what if there are no ordinary instruments and there is no valid reason to impose equality constraints on the parameters? Assume Z to be a vector of observed

Table 10 Interplay between trust and network (Lewbel 2SLS regressions)

Variables	Social network (1)	Trust (2)
Trust	0.02 (0.02) [0.01]	
Social network		0.04** (0.02) [0.06]
Income	0.01*** (0.00)	0.00 (0.00)
Male	0.01*** (0.00)	0.00 (0.00)
Married	-0.02*** (0.01)	0.00 (0.01)
Unemployed	-0.01 (0.01)	-0.03** (0.01)
Age	-0.00*** (0.00)	-0.00 (0.00)
Age squared	0.00** (0.00)	0.00* (0.00)
Freedom	0.00*** (0.00)	0.00*** (0.00)
Money	0.04*** (0.01)	0.01 (0.01)
Unsafe	0.02*** (0.01)	-0.04*** (0.01)
Help	0.02 (0.02)	0.02 (0.02)
Religion	0.06*** (0.01)	0.02*** (0.01)
Terrorism	0.01 (0.01)	0.00 (0.02)
Civil war	-0.00 (0.01)	0.01 (0.02)
Constant	0.97*** (0.03)	0.04 (0.03)
Waves dummies	Yes	Yes
Province dummies	Yes	Yes
Observations	6731	6731
R-squared	0.88	0.71

Robust standard errors in parentheses
 Standardized coefficients in brackets
 *** $p < 0.01$; ** $p < 0.05$;
 * $p < 0.1$

exogenous variables (Z could be a subset of X or could be equal to X). Lewbel (2012) argues that as long as the following moment conditions:

$$E(X\epsilon_1) = 0, \quad E(X\epsilon_2) = 0, \quad Cov(Z, \epsilon_1\epsilon_2) = 0$$

and some heteroskedasticity of ϵ_j are met, one can estimate the above set of equations by using $[Z - E(Z)]\epsilon_2$ as an instrument. Lewbel also suggests that if we have some additional ordinary instruments (say P), we can estimate the WB_i and T_i equations by a two-stage least squares or GMM estimation using P along with an estimate of $[Z - E(Z)]\epsilon_2$ as instruments to control for endogeneity. Proof of the above methodology and steps to reaching these conclusions is presented in the author's (2012) paper. In terms of the reliability of these estimates, Lewbel comments that "The resulting identification is based on higher moments and so is likely to produce less reliable estimates than identification based on standard exclusion restrictions, but may be useful in applications where traditional instruments are not available or could be used along with traditional instruments to increase efficiency" (p. 67).

Results for Lewbel's (2012) 2SLS estimations are presented in Tables 7, 8, 9 and 10. The models estimated here exactly correspond with those estimated for OLS. Table 7 presents 2SLS results for the association between trust and wellbeing. Here, we find that 2LS results are consistent with OLS results, as overall and across all measures of trust, there is a positive effect of trust on wellbeing. We find that OLS results understate the effect of trust on wellbeing when we consider the coefficient on the "people can be trusted" question (*Trust 1*). Lewbel's 2SLS results report a coefficient of 1.14 (and a standardized coefficient of 0.25) compared to OLS results that state a coefficient of 0.29 (and a standardized coefficient of 0.06). With regards to other measures of trust, results are virtually identical with only very minor variations in coefficient sizes. These minor variations are not reflected in the standardized coefficients for both estimation types, as they are the same across both the 2SLS and OLS estimations.

Table 8 presents 2SLS results for the association between social network and wellbeing. Consistent with OLS results, we find a positive effect of social network on wellbeing, except for variations in coefficient sizes that can be attributed to endogeneity bias. Specifically, we find that OLS results overstate the effect of social network on wellbeing. Furthermore, the coefficients on measures of social networks that capture membership in educational groups (*social network 3*) and membership in professional organizations (*social network 5*) are no longer statistically significant. Thus, there is a huge bias associated with endogeneity. In Table 9 we report results using overall measures of trust and social network, and here we observe similar trends with OLS results overstating the effect of trust on wellbeing. However, the effects of social networks in this case are identical to OLS results.

Turning to the interplay between trust and social networks in Table 10, we find that 2SLS results for the effect of social network on trust are identical to that of the OLS; however, with regard to the effect of trust on social network, OLS results overstate the effect of trust. Thus, overall, the observed relationships among trust, social networks and subjective wellbeing remain unchanged, except for slight variations in the magnitude of coefficients, which we attribute to endogeneity bias. Particularly, in most cases we observe that OLS results overstate the impact of wellbeing.

5 Robustness Checks

The existing literature on the determinants of subjective wellbeing uses either OLS or ordered logit regressions. The strand of the literature that uses the ordered logit estimation technique justifies this technique given the ordinal nature of the measure of subjective

wellbeing (see, e.g., Portela et al. 2013). To ensure that our results are robust to both estimation methods used in the existing literature, we also present ordered logit estimates. Results for these regressions are presented in Tables 11 and 12 for the effects of trust and social network, respectively.

Table 11 Trust and wellbeing (ordered logit regressions)

Variables	Trust 1 (1)	Trust 2 (2)	Trust 3 (3)	Trust 4 (4)	Trust 5 (5)	Trust 6 (6)	Trust 7 (7)
Trust	0.25*** (0.04) [0.05]	0.36* (0.19) [0.08]	0.15* (0.08) [0.03]	0.13* (0.07) [0.03]	0.24** (0.10) [0.02]	0.26** (0.10) [0.03]	0.33*** (0.11) [0.03]
Income	0.20*** (0.01)	0.20*** (0.01)	0.20*** (0.01)	0.20*** (0.01)	0.20*** (0.01)	0.20*** (0.01)	0.20*** (0.01)
Male	-0.13*** (0.04)	-0.14*** (0.04)	-0.14*** (0.04)	-0.14*** (0.04)	-0.14*** (0.04)	-0.14*** (0.04)	-0.14*** (0.04)
Married	0.32*** (0.07)	0.32*** (0.07)	0.32*** (0.07)	0.32*** (0.07)	0.32*** (0.07)	0.32*** (0.07)	0.32*** (0.07)
Unemployed	0.07 (0.14)	0.06 (0.14)	0.07 (0.14)	0.06 (0.14)	0.06 (0.14)	0.06 (0.14)	0.06 (0.14)
Age	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)
Age squared	0.07*** (0.01)	0.07*** (0.01)	0.07*** (0.01)	0.07*** (0.01)	0.07*** (0.01)	0.07*** (0.01)	0.07*** (0.01)
Freedom	0.37*** (0.01)	0.38*** (0.01)	0.38*** (0.01)	0.38*** (0.01)	0.38*** (0.01)	0.38*** (0.01)	0.38*** (0.01)
Money	-0.16 (0.11)	-0.15 (0.11)	-0.15 (0.11)	-0.16 (0.11)	-0.15 (0.11)	-0.15 (0.11)	-0.14 (0.11)
Unsafe	-0.23** (0.11)	-0.23** (0.11)	-0.23** (0.11)	-0.23** (0.11)	-0.24** (0.11)	-0.24** (0.11)	-0.24** (0.11)
Help	0.19 (0.18)	0.19 (0.18)	0.19 (0.18)	0.18 (0.18)	0.20 (0.17)	0.18 (0.18)	0.19 (0.18)
Religion	0.02 (0.07)	0.03 (0.07)	0.02 (0.07)	0.03 (0.07)	0.02 (0.07)	0.00 (0.07)	0.01 (0.07)
Terrorism	0.02 (0.15)	0.01 (0.15)	0.02 (0.15)	0.00 (0.15)	0.01 (0.15)	0.01 (0.15)	-0.00 (0.15)
Civil war	0.06 (0.15)	0.06 (0.15)	0.06 (0.15)	0.07 (0.15)	0.06 (0.15)	0.06 (0.15)	0.07 (0.15)
Waves dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6731	6731	6731	6731	6731	6731	6731

Robust standard errors in parentheses

Standardized coefficients in brackets

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 12 Social network and wellbeing (ordered logit regressions)

Variables	Network 1 (1)	Network 2 (2)	Network 3 (3)	Network 4 (4)	Network 5 (5)	Network 6 (6)
Social network	0.15 (0.13) [0.03]	0.29*** (0.07) [0.06]	0.27*** (0.08) [0.06]	0.20** (0.08) [0.04]	0.22* (0.11) [0.05]	0.36* (0.21) [0.07]
Income	0.20*** (0.01)	0.19*** (0.01)	0.20*** (0.01)	0.20*** (0.01)	0.20*** (0.01)	0.20*** (0.01)
Male	-0.13*** (0.04)	-0.14*** (0.04)	-0.14*** (0.04)	-0.14*** (0.04)	-0.14*** (0.04)	-0.13*** (0.04)
Married	0.32*** (0.07)	0.33*** (0.07)	0.33*** (0.07)	0.32*** (0.07)	0.32*** (0.07)	0.32*** (0.07)
Unemployed	0.06 (0.14)	0.05 (0.14)	0.07 (0.14)	0.06 (0.14)	0.06 (0.14)	0.06 (0.14)
Age	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)
Age squared	0.07*** (0.01)	0.07*** (0.01)	0.07*** (0.01)	0.07*** (0.01)	0.07*** (0.01)	0.07*** (0.01)
Freedom	0.38*** (0.01)	0.38*** (0.01)	0.38*** (0.01)	0.38*** (0.01)	0.38*** (0.01)	0.38*** (0.01)
Money	-0.15 (0.11)	-0.16 (0.11)	-0.16 (0.11)	-0.15 (0.11)	-0.16 (0.11)	-0.15 (0.11)
Unsafe	-0.25** (0.11)	-0.25** (0.11)	-0.25** (0.11)	-0.25** (0.11)	-0.24** (0.11)	-0.25** (0.11)
Help	0.19 (0.18)	0.18 (0.18)	0.17 (0.18)	0.19 (0.18)	0.19 (0.18)	0.20 (0.18)
Religion	-0.01 (0.08)	0.01 (0.07)	0.01 (0.07)	0.02 (0.07)	0.02 (0.07)	0.02 (0.07)
Terrorism	0.01 (0.15)	0.02 (0.15)	0.01 (0.15)	0.01 (0.15)	0.01 (0.15)	0.02 (0.15)
Civil war	0.06 (0.15)	0.06 (0.15)	0.06 (0.15)	0.07 (0.15)	0.07 (0.15)	0.06 (0.15)
Waves dummies	Yes	Yes	Yes	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6731	6731	6731	6731	6731	6731

Robust standard errors in parentheses

Standardized coefficients in brackets

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Overall, results show that the nature of the relationship between trust and wellbeing as well as between social network and wellbeing are not altered by the estimation technique used. Consistent with our main results, we find that trust has a positive association with subjective wellbeing and this finding is true across all measure of trust (Table 11). Similarly, from Table 12, we find results consistent with our main results. Specifically, we find

a positive association between social network and wellbeing, and this is true across all measures of social networks except one. While the positive effect of trust and social network on wellbeing is consistent across the ordered logit estimations, we find, however, that OLS results mostly overstate the effect of trust and social network on wellbeing. This is evident given the coefficient sizes, which are relatively larger for OLS results.

6 Discussion and Conclusions

Our study provides evidence that two dimensions of social capital, social networks and trust, are positively associated with subjective wellbeing. We also find that while trust facilitates social networks, social networks also facilitate trust. After controlling for the endogeneity of trust and social networks, we find that generalized trust (agreeing that people can generally be trusted) is not significantly associated with wellbeing in China. Thus, the general sense that people can be trusted does not significantly enhance wellbeing. However, trust in those around the individual, that is, in family, friends, neighbours, strangers, people of other religions and nationalities increases the likelihood of life satisfaction. Compared to other measures of trust, trust in family appears to be the strongest determinant of wellbeing, followed by trust in neighbours and then trust in people that respondents know. Other determinants of wellbeing that are relatively weaker include trust in strangers, as well as trust in people of other nationalities and religions. These results suggest that, in the case of China, the returns to trust are more pronounced when trust relates to familiar people such as family and neighbours, but relatively weaker when it relates to less familiar people such as strangers and people from different religious and national backgrounds.

We also find that while membership in self-help groups, sports groups and political parties is significantly associated with wellbeing, membership in professional, educational and religious groups is not. Thus, overall, across the seven measures of trust and six measures of social networks used in this study, we find evidence of trust exhibiting more consistent positive associations with subjective wellbeing than social networks.

The dominance of trust as a determinant of wellbeing could be a result of economic development trends adopted in China. China has placed significant emphasis on economic growth since the onset of the economic reform, and thus has paid less attention to social programmes that may help promote effective networking (Yip et al. 2007). According to these authors, since the collapse of China's cooperative medical system that relied heavily of social networks and community interactions, individuals now rely heavily on loans from families and friends to pay for medical services. These loans can only be facilitated based on trust; thus, indirectly, the health and wellbeing of individuals largely depend on trust.

From another perspective, the insignificant effect of social networks on wellbeing is specific to only three measures of social networks, that is, those related to membership in professional, educational and religious groups. Formal organizations in China may rarely exist; more importantly, in terms of religious membership, China is largely homogenous in that relatively few individuals belong to religious groups. Overall, the effect of religious participation on wellbeing in the case of China also contradicts some research providing evidence that participation in religious activities may enhance individual wellbeing (see, e.g., Ellison 1991). This insignificant effect in the case of China, then, could be as a result of the perception and boundaries of religion in that country. For instance, there is no clear boundary or distinction that separate one from the other in religions such as Buddhism,

Taoism and local Chinese folk religious practices, which are practised in China. Thus, while the boundaries in other multi-religious societies are relatively well defined, the religious boundaries in China are not so distinct; hence the level of difference between in-group and out-group social networks in terms of religion is not that large.

Contrary to the findings of some research (see, e.g., Bjørnskov 2003), we also find that the effect of social capital on subjective wellbeing in China is relatively weaker than the effect of income. The relatively weaker effect of social capital on wellbeing in China could be explained by demographic and economic factors, and the famous theory of Abraham Maslow (1943) on the hierarchy of needs provides some further insight here. According to Maslow, physical and material needs are the most important, and when these are met other needs may be considered. In this hierarchy, relationships and networks (which define social capital) are ranked third after safety needs. Given that the provision of physical needs such as shelter and food can be associated with the supply of income, one would expect income to be a stronger determinant of wellbeing than social capital, and this is evident in our results.

We argue that existing evidence that suggests that social capital is a stronger determinant of wellbeing is biased by the samples used in these studies, that is, from developed countries. The logic of such evidence is that in a sample of relatively developed and rich countries, income does not lead to more life satisfaction (Easterlin 1995); thus, individuals would seek higher levels of satisfaction in elements other than income, such as relationships. However, in the case of a developing country such as China, we argue that, consistent with Maslow's hierarchy of needs, higher levels of income would lead to more life satisfaction given that this is the basic element the average individual strives to attain.

By using regressions for sub-samples with different levels of income, we show that the income levels provided by the WVS reflect income scales. For China, these income scales range, in ascending order, from 1 to 10. We consider the first three income levels (scales 1–3) to be in the low income category, the last three (scales 8–10) to be in the high income category, and scales 4, 5, 6 and 7 to be in the middle class category. Results for these regressions are shown in Table 15 in “Appendix”. For the low income category (Panel 1), we find that except for *Trust 1* and *Trust 7*, there is no significant association between trust and wellbeing. In Panel 2, results for the middle class category show statistically significant coefficients for all measures of trust except *Trust 7*. Lastly, results in the high income category (Panel 3) are significant for all measures of trust except *Trust 5* and *Trust 7*. However, comparing the standardized coefficients, it is clear that the effect of trust is relatively stronger in the high income category than in the middle class category, and effects for the middle class category are also relatively stronger and significant compared to the low income category. This confirms our conclusion regarding the effects of income and social capital on trust.

Maslow's (1943) theory also sheds more light on our finding that suggests that the returns to trust are more pronounced when trust relates to familiar people. Here, we argue that as wellbeing depends on food, safety and material wellbeing, a person is more likely to get help for these things from his immediate group (relatives and friends) than from outsiders.

In terms of policy, our results show that those aimed at promoting trust and membership in various social groups can facilitate the exchange of support and improve life satisfaction or wellbeing. In addition, redirecting some attention from economic activities towards the promotion of social capital, particularly the enhancement of social networks, can play a significant role in improving wellbeing as well as economic development in China.

Appendix

See Tables 13, 14 and 15.

Table 13 Description of variables, world values survey

Variable	Descriptions
Wellbeing	All things considered, how satisfied are you with your life as a whole these days? 1 means you are “completely dissatisfied” and 10 means you are “completely satisfied” where would you put your satisfaction with your life as a whole?
Trust	Average of all measures of trust
Trust 1	Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?
Trust 2	Trust for family—dummy variables if respondent trusts family
Trust 3	Trust for neighbour or neighbour—dummy variables if respondent trusts neighbour or neighbour
Trust 4	Trust for people you know—dummy variables if respondent trusts people they know
Trust 5	Trust for strangers—dummy variables if respondent trusts strangers
Trust 6	Trust for people from other religion—dummy variables if respondent trusts people from other religion
Trust 7	Trust for people of other nationality—dummy variables if respondent trusts people of other nationality
Social network	Average of all measures of social network
Social network 1	Dummy variable equals to 1 if respondent belongs to a religious organization
Social network 2	Dummy variable equals to 1 if respondent belongs to a sports organization
Social network 3	Dummy variable equals to 1 if respondent belongs to an educational organization
Social network 4	Dummy variable equals to 1 if respondent belongs to a political party
Social network 5	Dummy variable equals to 1 if respondent belongs to a professional organization
Social network 6	Dummy variable equals to 1 if respondent belongs to a self-help group
Income	Scale of income
Male	Dummy variable equals to 1 if respondent is male
Married	Dummy variable equals to 1 if respondent is married
Unemployed	Dummy variable equals to 1 if respondent is unemployed
Age	Age of respondent
Age squared	Square of age/100
Freedom	How much freedom of choice and control do you have over your life? scale where 1 means “no choice at all” and 10 means “a great deal of choice”
Money	Dummy variable equals to 1 if respondent has in the past gone without money
Unsafe	Dummy variable equals to 1 if respondent has in the past felt unsafe from crime
Help	Dummy variable equals to 1 if it is important for respondent to help people nearby
Religion	Dummy variable equals to 1 if religion is important to respondent
Terrorism	Dummy variable equals to 1 if respondent worries about a terrorist attack
Civil war	Dummy variable equals to 1 if respondent worries about a civil war

Table 14 Provinces included in sample

Anhui	Hubei	Shangdong
Beijing	Hunan	Shanghai
Fujian	Inner Mongolia	Shanxi
Gansu	Jiangsu	Sichuan
Guangdong	Jiangxi	Tianjin
Guangxi	Jilin	Tibet
Guizhou	Liaoning	Xinjiang
Hebei	Qinghai	Yunnan
Heilongjiang	Shaanxi	Zhejiang
Henan	Chongqing	

Table 15 Income level regressions (trust)

Variables	Trust 1 (1)	Trust 2 (2)	Trust 3 (3)	Trust 4 (4)	Trust 5 (5)	Trust 6 (6)	Trust 7 (7)
Low-income level							
Trust	0.28*** (0.06) [0.07]	0.37 (0.27) [0.09]	0.15 (0.10) [0.04]	0.12 (0.09) [0.03]	0.19 (0.12) [0.02]	0.19 (0.13) [0.02]	0.31** (0.13) [0.03]
Observations	2411	2411	2411	2411	2411	2411	2411
R-squared	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Middle class-income level							
Trust	0.31*** (0.09) [0.06]	0.84** (0.42) [0.17]	0.35* (0.19) [0.07]	0.28* (0.15) [0.05]	0.44** (0.20) [0.04]	0.37* (0.21) [0.03]	0.26 (0.24) [0.02]
Observations	3814	3814	3814	3814	3814	3814	3814
R-squared	0.23	0.22	0.22	0.22	0.22	0.22	0.22
High-income level							
Trust	0.29* (0.16) [0.07]	4.06*** (0.47) [0.91]	0.66 (0.46) [0.14]	0.83** (0.35) [0.17]	-0.78 (0.98) [-0.07]	1.19** (0.54) [0.10]	0.21 (0.46) [0.02]
Observations	506	506	506	506	506	506	506
R-squared	0.29	0.30	0.29	0.30	0.29	0.30	0.29

Robust standard errors in parentheses

Standardized coefficients in brackets

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

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