Journal of Infrastructure, Policy and Development 2024, 8(8), 5704.
https://doi.org/10.24294/jipd.v8i8.5704

Article

Social capital, health risk avoidance, and the enrollment of health insurance: The case of rural middle-aged and elderly in China

Teng Wang*, Zhaoying Liu, Lina He, Miaomiao Lu

School of Business, Liaocheng University, Liaocheng 252000, China
*** Corresponding author:** Teng Wang, tengwang@lcu.edu.cn

CITATION

Wang T, Liu Z, He L, Lu M. (2024). Social capital, health risk avoidance, and the enrollment of health insurance: The case of rural middle-aged and elderly in China. Journal of Infrastructure, Policy and Development. 8(8): 5704. https://doi.org/10.24294/jipd.v8i8.5704

ARTICLE INFO

Received: 7 April 2024
Accepted: 20 June 2024
Available online: 26 August 2024

Abstract: Low enrollment intention threatens the funding pools of rural insurance schemes in developing countries. The purpose of this study is to investigate how social capital enhances the enrollment of health insurance among rural middle-aged and elderly. We propose that social capital directly increases health insurance enrollment, while indirectly influences health insurance through health risk avoidance. We used data from the China Health and Retirement Longitudinal Study (wave 4) dating the year of 2018, instrumental variable estimation was introduced to deal with the endogeneity problem, and the mediation analysis was used to examine the mechanism of social capital on insurance enrollment. The results show that social capital is positively related to social health insurance enrollment, and the relationship between social capital and social health insurance enrollment is mediated by health risk avoidance.

Keywords: social capital; social health insurance; CHARLS; instrumental variable; mediation effect

1. Introduction

Social health insurance (SHI) is a form of financing scheme initiated by governments to mitigate the economic risks associated with healthcare costs. Unlike private health insurance, SHI pools funds not only from individuals and households but also from the government (Shi et al., 2022). In China, the rural SHI system relies mainly on the New Rural Cooperative Medical Scheme (NRCMS), but reimbursement for the reimbursement rates for the NRCMS were at least 10% lower than those for the Urban Resident-Based Basic Medical Insurance scheme (URBMI). This disparity arises from the fact that county governments administer NRCMS funds, while municipal governments manage URBMI funds, which have better financial conditions (Meng et al., 2015). Therefore, despite the universal coverage of SHI in China, more than 7% of rural residents chose to drop out SHI (Xu and Yang, 2021), low enrollment intention threatens the funding pools of rural insurance schemes (Zhou and Liu, 2022). The sustainability of universal coverage SHI in rural areas is fragile due to the lack of enrolment intention.

To understand the factors influencing insurance enrollment, classical theories emphasize the feature of asymmetric and incomplete information, the insured have more information about risks than insurers do. The monopoly on private information increases transaction costs and leads to moral hazard and adverse selection (Dionne, 2013). Theory of risk management pays more attention to personal traits such as self-protection and self-insurance, arguing that intentions to avoid risks influence insurance enrollment (Ehrlich and Becker, 1992). Similarly, the term of health risk avoidance suggests that some consumers are more likely to engage in preventive health behaviors

(Moorman and Matulich, 1993). Prior research has also suggested a positive relationship between personal socio-economic status and insurance enrollment (Ying et al., 2007). In addition to the personal characteristics, insurance enrollment is also related to structural factors, such as regional development level and institutional characteristics (Nsiah-Boateng and Aikins, 2018). Social capital is resources embedded within social networks, such as trust, obligation and cooperation within specific social connections (Nahapiet and Ghoshal, 1998). Some research conducted in developing countries reported the positive role of social capital in enhancing SHI enrollment (Ko et al., 2018; Mladovsky and Mossialos, 2008; Zhang et al., 2006), but the mechanism still remains unknown.

However, while previous literature has established that social capital improves health insurance enrollment, the mechanism of the influence of social capital remains unknown. As noted by some researchers, social capital is an umbrella term that is widely used in different disciplines (Lin et al., 2001), and research on how social capital works in the context of health context are rare (Hawe and Shiell, 2000). Therefore, this research aims to answer the following two questions: (1) Can social capital affect social health insurance enrollment among middle-aged and elderly in rural areas? (2) How does social capital affect health insurance enrollment? Taken together, our research makes two contributions: Firstly, this study introduced instrumental variable to handle endogeneity problem which was ignored by prior research. Secondly and more importantly, we revealed how social capital affect health insurance enrollment with the mediation role of health risk avoidance.

2. Literature review and hypotheses

2.1. Social capital and insurance enrollment

Social capital is the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit (Nahapiet and Ghoshal, 1998). Studies conducted in developing countries have reported that social capital plays a critical role in increasing access to health care (Hollard and Sene, 2016), improving health and well-being (Yip et al., 2007), and increasing utilization of health services (Nauenberg et al., 2011). Despite the fact that rural populations in developing countries are disadvantaged in terms of health insurance coverage (Anjorin et al., 2022), only several studies have examined the positive effect of social capital on insurance enrollment. Social capital can increase the participation rate of community-based health insurance in rural areas (Zhang et al., 2006) and increase the willingness to pay for health insurance (Ko et al., 2018). In East Asia, social capital is rooted in strong ties. The principle of reciprocity or guanxi is one of the core values of Confucianism. The ethics of Confucianism encourage individuals to care for their family members, especially to shoulder the responsibility for caring for the elderly (e.g., filial piety) (Fei et al., 1992). With the influence of Confucianism, the frequent mutual support within strong ties characterizes social capital in China, such as parents sponsoring their children to buy a house and people donating to relatives with a serious disease. In the literature examining the relationship between social capital and health insurance, social capital has been found to be positively associated with the willingness to join community-

based health schemes (Zhang et al., 2006).

H1: Social capital is positively associated with health insurance enrollment.

2.2. Health risk avoidance and health insurance enrollment

The notion of health risk avoidance refers to the consumers' goal-directed arousal to engage in preventive health behaviors (Moorman and Matulich, 1993). Empirical research reveals that the motivation to avoid potential health risks decreases international travel (Chua et al., 2021), enhance purchase intention for digital health devices (Wang et al., 2022), and is positively linked to insurance purchase (Doiron et al., 2008). Insurance enrollment suggests that individuals want to avoid the potential financial risks or uncertainties caused by disease (Chui and Kwok, 2008). Studies of the insurance industry have reported that the level of uncertainty avoidance (i.e., being more uncomfortable with uncertainty and ambiguity) is related to risk-taking behavior (Gaganis et al., 2019). Therefore, the evaluation and perception of one's own health uncertainty and risk are crucial factors in health insurance enrollment decisions.

In contrast to concepts such as health ability or health literacy, health risk avoidance emphasizes the belief in taking preventive actions to avoid potential health risks. Therefore, individuals with higher propensity to avoid future health uncertainties and ambiguities are more likely to enroll in health insurance schemes, because health insurance can reduce risks associated with health problems. We therefore propose the following hypothesis:

H2: Health risk avoidance is positively associated with health insurance enrollment.

2.3. Social capital and health risk avoidance

In addition to providing resources to individuals, social capital is also considered as a structural power beyond the individual (Castiglione et al., 2008). For example, social capital is seen as shared social norms that can control an individual's behavior (Portes, 2000). Similarly, Woolcock and Narayan argued that social capital can promote internal solidarity in a community because of the homogeneity among community members (Woolcock and Narayan, 2000). Furthermore, Kawachi and Berkman suggested that social capital is related to social cohesion and can diffuse health related norms such as exerting social control over deviant health-related behavior (Kawachi and Berkman, 2000). For example, the literature of normative health behaviors has proposed the link between social control and health behavior (Mahalik et al., 2007). Specifically, if an individual finds that friends and relatives engage in health behaviors, such as quitting smoking, he or she will also engage in such a normative behavior. Therefore, we view social capital as a source of social control from which health risk avoidance derived.

H3(a): Social capital is positively associated with health risk avoidance.

Empirical research on social capital has shown that it improves health status by reducing unhealthy behaviors (Ho, 2016), is positively associated with smoking cessation (Giordano and Lindstrom, 2011) and is negatively related to smoking and drinking behaviors (Chuang and Chuang, 2008). Based on the discussion of the link between health risk avoidance and health insurance enrollment, we propose the

mediation role of health risk avoidance (**Figure 1**) as follows:

H3(b): Health risk avoidance mediates the positive relationship between social capital and health insurance enrollment.

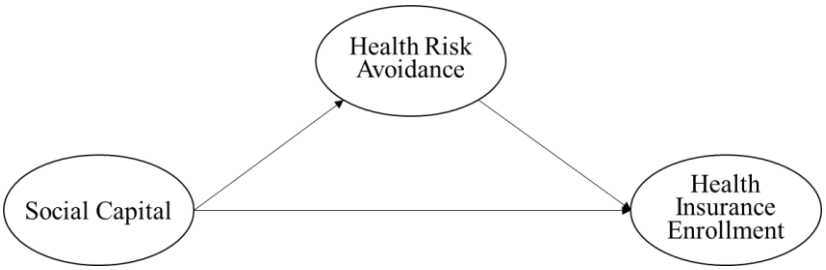

Figure 1. Hypothesis of the direct and indirect effect.

3. Data and variable definitions

3.1. Data collection

The China Health and Retirement Longitudinal Study (2018) data were used in this study. The China Health and Retirement Longitudinal Study (CHARLS) is a nationally representative longitudinal survey of Chinese citizens aged 45 and above (Zhao et al., 2014), and 17,708 individuals in 10,257 households are included (CHARLS, 2018), which spans 150 districts and 450 villages. In addition, the data at the community level are from CHARLS (2011). A total of 6275 valid questionnaires are obtained after removing urban residents. As presented in **Table 1**, 52.10% of the rural respondents are females, and 47.90% are males. The average age is 61.58 years old; the age distribution of the sample is 45 to 59 years old (43.75%), 60 to 74 years old (44.49%), 75 years old and above (11.76%).

Table 1. Descriptive statistics.

Variables	Description	Mean	S.D.	Min	Max
Social Health Insurance	Dummy variable, equals 1 if the respondent enrolls URRMI or NRCMS	90.02%		0	1
Social Capital	Continuous variable, 6 dichotomous variables are measured by asking whether the respondent in the past year received/provided financial or non-financial supports from/to parents/children/friends. These dichotomous values are added to form a composite score	1.359	1.029	0	6
Health Risk Avoidance	Dummy variable, equals 1 if the respondent does not smoke	71.52%		0	1
Comorbidity	Dummy variable, equals 1 if the respondent has two or more chronic disease	16.54%		0	1
Gender	Dummy variable, equals 1 if the respondent is female	52.10%		0	1
Age	Continuous variable, 45 to 59 years old (43.75%), 60 to 74 years old (44.49%), 75 years old and above (11.76%)	61.580	9.716	45	108
Marital	Dummy variable, equals 1 if married or separated and 0 if single, divorced, or widowed	79.63%		0	1
Household Size	Continuous variable, measured by number of family members living in the same household	2.063		1	13
Per Capita Expenditure (log)	Continuous variable, measured by per capita expenditure without medical cost in last year	7.227	1.689	−0.511	12.838
Education	Continuous variable, measured by respondent's years of education	5.670	3.612	0	16
Financial Literacy	Continuous variable, measured by number of financial products the respondents possess (e.g., bonds, stocks, and funds)	0.006	0.079	0	2

Table 1. (*Continued*).

Variables	Description	Mean	S.D.	Min	Max
Community Primary Hospital	Dummy variable, equals 1 if the community has primary hospitals (e.g., township hospitals, and community healthcare center)	96.06%		0	1
Community General Hospital	Dummy variable, equals 1 if the community has general hospitals	58.29%		0	1
Family Doctor Service	Dummy variable, equals 1 if the respondent has received paid family doctor services	4.61%		0	1
GDP of Province	Continuous variable, GDP (in hundreds of billions) of 2018 at province level	29.747	27.210	1.548	99.945
Index of Marketization	Continuous variable, marketization index of 2018 in respondent's province	6.259		3.320	8.170
Siblings	Continuous variable, number of respondents' living siblings	3.960	1.858	0	14
TFR	Continuous variable, total fertility rate of 2010 in respondent's province	1.189	0.202	0.737	1.748

3.2. Dependent variable: Health insurance enrollment

In rural areas of China, social health insurance system involves Urban and rural resident medical insurance (URRMI), and New rural cooperative medical scheme (NRCMS). NRCMS was launched in 2003 and depends on funds collected from rural residents, communities, and government. URRMI was launched in 2008, URRMI integrated urban resident-based basic medical insurance scheme (URBMI) and NRCMS to reduce inequality in the compensation scope between rural and urban residents. Enrollment in URRMI and NRCMS, which are voluntary social health insurance schemes, is recorded as 1 if the respondent is enrolled and 0 otherwise.

3.3. Independent variable: Social capital

Reciprocity captures the contingent nature of social capital, emphasizing the obligation and norms to help each other embedded in social networks (Stone, 2001). Therefore, following the previous studies using data of CHARLS, social capital was measured by the reciprocity within strong ties. Respondents were asked whether they receive financial support (e.g., money or in-kind payment) from or provide to parents, children, and friends. These dichotomous values are added to form a composite score. This method is suggested and applied in previous work using CHARLS to measure social capital (Shen et al., 2013).

3.4. Mediation variable: Health risk avoidance

We propose that health risk avoidance is positively associated with health insurance enrollment. We use smoking as the proxy variable for health risk avoidance since it has been proven to relate to health risk avoidance and affects health behaviors. Tobacco smoking is estimated to account for more than 1 million annual deaths in China, and tobacco smokers have been proved to have higher risks of mortality (Chan et al., 2022). Health risk avoidance equals 1 if the respondent does not smoke and 0 otherwise.

3.5. Control variables

Relevant control variables were added in our research model (**Table 1**). Socioeconomic status was measured with education and per capita expenditure. It is

difficult to measure income of rural residents because most of them have no regular salary. We use per capita expenditure to measure the income of the respondents, this method is recommended for research in developing countries (Strauss and Thomas, 2007).

Financial literacy refers to the extent to which individuals understand and use financial-related information (Huston, 2010). Since insurance is generally regarded as a type of financial products, the decision to enroll health insurance schemes will be influenced by financial literacy. In this research, financial literacy is measured by the number of financial products the respondents possess (e.g., bonds, stocks, and funds).

We used comorbidity to measure health conditions. Comorbidity is defined as respondents who have two or more chronic diseases (van den Akker et al., 1996).

The availability of primary or general hospitals in the community and access to family doctors for the respondents are used to measure the level of health service accessibility.

We used provincial GDP and the index of marketization to measure the economic development level. Provincial GDP is obtained from the National Bureau of Statistics of China (2019). The index of marketization is obtained from China Market Index Database (2019).

4. Empirical strategy

As noted in prior research, empirical estimates of the effect of social capital may be biased, because social homophily caused endogeneity problem, high similarities within social networks increase social capital (Mouw, 2006). Therefore, we introduced instrumental variables (IVs) approach to deal with endogeneity problems. An instrumental variable affects endogenous variables but without having a direct effect on dependent variables (Angrist and Krueger, 2001).

We used Siblings and total fertility rate (TFR) as the IVs of social capital. IV-Probit regression is used to estimate the influence of social capital and health risk avoidance on health insurance enrollment. We use the two-stage least square method (2SLS) via Stata 14.0 to estimate the result. The IV-probit regression model based on the 2SLS method is set as follows:

$$\text{Social\_capital} = \alpha_0 + \alpha_1\text{Siblings} + \alpha_2\text{TFR} + \alpha_3\text{Control} + \sigma_1 \quad (1)$$

$$\text{Health\_insurance} = \beta_0 + \beta_1\text{Social\_capital} + \beta_2\text{Control} + \sigma 2 \quad (2)$$

In addition, in our research, we use smoking behavior to measure health risk avoidance, but health risk avoidance may be influence by omitted variables. Some suggested that smoking behavior is more prevalent among specific occupational groups (Sterling and Weinkam, 1990). We use TFR as IV to handle the endogeneity caused by omitted variables related to health risk avoidance. The IV-probit regression model based on the 2SLS method is set as follows:

$$\text{Health\_risk\_avoidance} = \pi_0 + \pi_1\text{TFR} + \pi_2\text{Control} + \sigma_3 \quad (3)$$

$$\text{Health\_insurance} = \lambda_0 + \lambda_1\text{Health\_risk\_avoidance} + \lambda_2\text{Control} + \sigma_4 \quad (4)$$

4.1. Instrumental variables of social capital: number of siblings

The reason we choose the number of siblings as an IV is that social capital is closely related to the scale of strong ties. According to a cross-sectional study

conducted in Asia, people who were raised with one or two siblings had more social support than those who were raised alone (Tani et al., 2022). Therefore, we assume that people who possess larger strong ties tend to accumulate more social capital. This IV was estimated by asking respondents about the number of siblings that still alive.

4.2. Instrumental variables of health risk avoidance: Total fertility rate

TFR is the average number of children that are born by a woman during her reproductive life (e.g., 15–45 years). Traditionally, researchers agree that TFR is an indicator of collectivism, the pursuit of patrilineal family and lineage prosperity of collectives results in high TFR (Gong et al., 2021). Research has confirmed that mothers tend to have more children in conventional cultural contexts (Brusin et al., 2021). People born in collectivist cultures are more inclined to depend on in-groups (e.g., family members, clans, and tribes) (Schwartz, 1990). Following such a logic, we believe that in areas with high TFR, the behavior of mutual assistance within the family is more frequent. Therefore, in areas with higher TFR, the behavior of mutual assistance within the family is more frequent.

4.3. Strength of IVs

To avoid biased estimation caused by weak IVs, it is necessary to test the strength of the IVs (Staiger and Stock, 1994). The strength of the IVs needs to meet two criteria. First, according to Stock and Yogo, if the *F*-statistic in first-stage regression should is greater than 10, the hypothesis of weak IVs is rejected (Stock and Yogo, 2002). Second, the direction of IVs should be consistent with theoretical assumptions.

Table 2 demonstrated the results of Equations (1) and (3), in the model with social capital as the dependent variable, the *F*-value of the first-stage regression is 22.61. Both Siblings and TFR positively affect social capital, indicating that the number of siblings and TFR are not weak IVs for social capital. In the model with health risk avoidance as the dependent variable, the *F*-value of the first-stage regression model is 208.01. The TFR positively affects health risk avoidance, so the TFR is not a weak IV for health risk avoidance.

Table 2. Results of the first stage.

Variables	Social capital	Health risk avoidance
Siblings	0.016* (2.27)	-
TFR	0.151* (2.09)	0.125*** (4.41)
Health Risk Avoidance	0.035	-
Gender	0.034	0.516***
Age	−0.008***	0.004***
Marital	0.150***	0.043***
Household Size	−0.040***	0.003
Comorbidity	0.041	0.046***
Per Capita Expenditure (log)	0.069***	0.006**
Education	0.014**	0.003***

Table 2. (*Continued*).

Variables	Social capital	Health risk avoidance
Financial Literacy	−0.118	0.038
Family Doctor Service	0.068	0.005
Community General Hospital	−0.008	0.036**
Community Primary Hospital	0.161*	0.013
GDP of Province	0.004***	−0.001***
Index of Marketization	−0.015	0.030***
Constant	0.816***	−0.188**
F-statistics	22.61	208.01
Observations	6275	6275

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; Robust *t*-statistics in parentheses.

5. Results

5.1. Social capital and health insurance enrollment

The positive effect of social capital on insurance enrollment was determined. As presented in **Table 3**, in model 1-1, with social health insurance as the dependent variable, social capital improves social health insurance enrollment ($\beta = 0.069$, $p < 0.01$). In model 1-2, the effect of social capital remains significant after adding health risk avoidance ($\beta = 0.069$, $p < 0.01$). To exclude the influence of endogeneity bias, we used Siblings and TFR as the IVs of social capital, and the coefficient of social capital was estimated with probit regression based on the 2SLS method. The Wald test of model 1-3 is significant ($p < 0.001$), indicating that there is an endogenous problem in the influence of social capital on social health insurance. Social capital positively affects social health insurance enrollment ($\beta = 2.437$, $p < 0.05$). It reveals that social capital still improves social health insurance enrollment after introducing the two IVs (Siblings and TFR). Therefore, H1 is supported.

Table 3. The effect of social capital and health risk avoidance on insurance enrollment.

Variables	Social insurance enrollment			
	Model 1-1	Model 1-2	Model 1-3	Model 1-4
	Probit	Probit	IV-Probit	IV-Probit
Social Capital	0.069** (2.91)	0.069** (2.91)	2.437* (2.51)	0.047 (1.59)
Health Risk Avoidance	-	0.002 (0.04)	−0.084 (−0.80)	3.833** (2.97)
Gender	0.105*	0.104	0.026	−1.865**
Age	−0.015***	−0.015***	0.005	−0.030***
Marital	0.101	0.101	−0.265	−0.065
Household Size	−0.004	−0.004	0.091*	−0.018
Comorbidity	−0.080	−0.080	−0.181	−0.260**
Per Capita Expenditure (log)	−0.053***	−0.053***	−0.218**	−0.077***
Education	−0.045***	−0.045***	−0.077***	−0.055***

Table 3. (*Continued*).

Variables	Social insurance enrollment			
	Model 1-1	**Model 1-2**	**Model 1-3**	**Model 1-4**
	Probit	**Probit**	**IV-Probit**	**IV-Probit**
Financial Literacy	−0.911***	0.141	−0.018	0.111
Family Doctor Service	0.141	−0.068	−0.045	−0.197**
Community General Hospital	−0.068	0.227*	−0.186	0.139
Community Primary Hospital	0.227*	−0.045***	−0.077***	0.002
GDP of Province	−0.001	−0.001	−0.009*	−0.191***
Index of Marketization	−0.105***	−0.105***	−0.045	−0.055***
Constant	3.177***	3.178***	0.583	3.489***
Wald test of exogeneity	-	-	16.86***	14.71***
Observations	6275	6275	6275	6275
Instrumented variable	-	-	Social capital	Health Risk Avoidance
Instrumental variable	-	-	Siblings, TFR	TFR

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; Instrumented variable: Social capital; Instrumental variable: Siblings, TFR.

Since we have two instruments (Siblings and TFR) and one instrumented, the estimation of an overidentified model can be performed to prove that IVs are exogenous (Cameron and Trivedi, 2010). We used the generalized method of moments (GMM)for the over identification test (Hansen, 1982). Hansen's J chi-square equals to 0.505 (p = 0.477), accepting the null hypothesis and conclude that the overidentifying restriction is valid, in other words, Siblings and TFR as IVs are exogenous.

5.2. Health risk avoidance and health insurance enrollment

The relationship between health risk avoidance and health insurance enrollment was significant. Results of model 1-2 in **Table 3** indicates that the relationship between health risk avoidance and health insurance enrollment is not significant. If health risk avoidance is endogenous, the probit regression will not be consistent. Therefore, we introduce TFR as an IV to investigate the effect of health risk avoidance. The effect of health risk avoidance is significant in model 1-4 after adding TFR as IV ($\beta = 3.833$, $p < 0.01$), in model 1-4, the Wald test is significant ($p < 0.001$), indicating that health risk avoidance in model 1-4 is endogenous. With the introduction of TFR as IV, we conclude that health risk avoidance is positively associated with SHI enrollment. Thus, H2 is supported.

5.3. The mediation role of health risk avoidance

Our results show that social capital increased health risk avoidance. As displayed in **Table 4**, the relationship between Social Capital and Health Risk Avoidance is not significant in model 2-1, this may be influenced by endogeneity. Given the potential endogeneity of Social Capital, we introduce Siblings and TFR as IVs in model 2-2 to estimate the effect of social capital on Health Risk Avoidance. In model 2-2, the Wald test is significant ($p < 0.001$), suggesting that Social Capital in model 2-2 is

endogenous. After eliminating the endogenous interference, we find that Social Capital positively affects Health Risk Avoidance ($\beta = 1.743, p < 0.05$). Taken together, we conclude that H3(a) is supported.

Table 4. The effect of social capital on health risk avoidance (IV-probit results).

	Health Risk Avoidance	
Variables	**Model 2-1 Probit**	**Model 2-2 IV-Probit**
Social Capital	0.024 (1.22)	1.743* (2.32)
Gender	1.879***	1.801***
Age	0.014***	0.028***
Marital	0.163**	−0.103
Household Size	0.017	0.084*
Comorbidity	0.182**	0.108
Per Capita Expenditure (log)	0.029*	−0.091
Education	0.008	−0.015
Financial Literacy	0.116	0.345
Family Doctor Service	0.019	−0.104
Community General Hospital	0.148***	0.165**
Community Primary Hospital	0.111	−0.194
GDP of Province	−0.003***	−0.009**
Index of Marketization	0.097***	0.139***
Constant	−2.212***	−4.094***
Wald test of exogeneity	-	12.03***
Observations	6275	6275
Instrumented variable	-	Social Capital
Instrumental variable	-	Siblings, TFR

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

In this research, we assume that Health Risk Avoidance positively mediates the relationship between Social Capital and health insurance enrollment. To eliminate endogenous bias related to health risk avoidance, we used TFR as IV to estimate the mediation role of health risk avoidance. We draw on the method to estimate the IV-mediation developed by Dippel (Dippel et al., 2020). We examine whether health risk avoidance plays a mediating role (see **Table 5**).

As demonstrated by **Table 5**, the total effect is marginal significant ($\beta = 0.523, p < 0.1$), the *P*-value of indirect effect is 0.110, which is near to marginal significance. Although 0.05 has been widely applied as a threshold to determine the significance, recent researchers proposed that the selection of significance level depends on factors such as sample size, conventions in disciplines, and precision of measurements (Wasserstein and Lazar, 2016). Following suggestions of Kim and Choi, we conclude that the mediation role of Health Risk Avoidance is determined at marginal level of significance (Kim and Choi, 2021). Therefore, H3(b) is supported.

Table 5. Mediating effect test result.

	SHI enrollment	
	Coefficients	***P*-value**
Total effect	0.523* (1.85)	0.064
Direct effect	0.008 (1.61)	0.107
Indirect effect	0.515 (1.60)	0.110
Control variables	Controlled	
Instrumented variable	Health Risk Avoidance	
Instrumental variable	TFR	

Note: * $p < 0.1$.

6. Conclusion and discussion

6.1. Main findings

Drawing on the nationally representative longitudinal survey (CHARLS, 2018), this study has explored the role of social capital in determining social health insurance enrollment in rural areas. Firstly, we proved that social capital improves health insurance enrollment in rural areas, which is in line with prior research based on social capital theory, indicating that residents with more social connections are more likely to engage in health insurance projects. Secondly and more importantly, the link between social capital and health insurance enrollment is mediated by health risk avoidance, suggesting that individuals with higher social capital are more likely to in preventive health behaviors.

In short, we found that social capital is positively associated with health risk avoidance and indirectly increases social health insurance enrollment. In addition, with the introduction of instrumental variables, this research provides more valid results of the effect of social capital. The specific results are as follows:

(1) Social capital is positively related to SHI enrollment among middle-aged and elderly rural residents in China, the reciprocity behaviors within strong ties improve the sustainability of SHI founding pools in rural areas.

(2) Social capital increases SHI enrollment via the positive mediation effect of health risk avoidance, social capital based on strong ties of rural residents enhance the awareness of health uncertainties, and further encourage the enrollment of SHI.

6.2. Contributions

From the theoretical perspective, our findings add to the social capital literature by revealing the mechanism of social capital. Specifically, our findings suggest that the role of social capital and health risk avoidance should receive more attention in the health insurance realm. Although previous literature has noticed the positive role in health promotion, health care access and health service delivery (Hollard and Sene, 2016; Kawachi and Berkman, 2000; Yip et al., 2007), only a few of them recognized the relationship between social capital and health insurance. Specifically, most research in the health field emphasizes tangible resources, such as information and

reciprocity within social networks, while ignoring intangible elements, such as risk attitudes. More importantly, health factors such as health risk avoidance in the health insurance context have not received sufficient attention.

Our results also provide important practical implications. In China, less than 30% of the population was covered by SHI in 2002, prompting the government to launch an ambitious health care reform in 2009, and the coverage rate reached 95% in 2013 (Meng et al., 2015). Both governments and residents should contribute to the sustainability of founding pools, but the rapid increase in costs has been considered as financial burden for rural elderly. Encouraging rural residents to pay for insurance that consistently increased in cost presents a significant challenge. Although the Chinese government has reached its policy goal of expanding health insurance coverage, there is still the challenge to maintain the continuance intention to enroll in insurance schemes among elderly residents. Since 2020, the Chinese government has proposed new insurance schemes that combine the features of social and commercial insurance such as Huiminbao insurance. Policymakers expect that such new insurance products will benefit residents that demand higher reimbursement and attract more residents to stay in health insurance schemes. As demonstrated by our empirical findings, social capital improves health risk avoidance and insurance enrollment. Therefore, we suggest that a family-centered health insurance scheme would increase the willingness to join, for instance, allowing other family members to benefit from such insurance scheme. Insurers would continue to pay for SHI because the perception of health risks of other family members, as suggested by our results, social capital based on strong ties may increase the intention to avoid health risks.

6.3. Limitations

Our sample is limited to middle-aged and elderly people in rural areas, and the mechanism by which social capital affects health insurance enrollment should be further investigated in a broader population. We suggest that future studies further investigate the role of TFR as an IV and provide more theoretical implications in this direction. In addition, the mediating effect of health risk avoidance was marginally significant, in part because we chose smoking as a proxy variable, which could not be measured with the same precision as using a scale in a psychological study, we suggest that future research could be conducted by structural equation modeling.

6.4. Conclusion

Although social capital has been considered as an umbrella concept, prior research has not reached agreement on the mechanism of social capital, our findings suggest that health risk avoidance plays a mediation role in the relationship between social capital and health insurance enrollment. Social capital has been proved to play a positive role in developing countries, our results further reveal that the social insurance system may benefit from the social capital processed by rural residents, a founding scheme based on rural social networks can facilitate the sustainability.

Author contributions: Conceptualization, TW and ML; methodology, TW; software, TW; formal analysis, TW, ZL and LH; investigation, TW; resources, TW; data curation, TW; writing—original draft preparation, TW; writing—review and editing, TW and

ML; visualization, ZL, LH and ML; project administration, TW. All authors have read and agreed to the published version of the manuscript.

Funding: This work was supported by the National Social Science Foundation of China [23CJY084].

Conflict of interest: The authors declare no conflict of interest.

Abbreviations

SHI	Social health insurance
CHARLS	The China Health and Retirement Longitudinal Study
IV	Instrumental variables
TFR	Total fertility rate

References

Angrist, J. D., & Krueger, A. B. (2001). Instrumental Variables and the Search for Identification: From Supply and Demand to Natural Experiments. Journal of Economic Perspectives, 15(4), 69–85. https://doi.org/10.1257/jep.15.4.69

Anjorin, S. S., Ayorinde, A. A., Abba, M. S., et al. (2021). Equity of national publicly funded health insurance schemes under the universal health coverage agenda: a systematic review of studies conducted in Africa. Journal of Public Health, 44(4), 900–909. https://doi.org/10.1093/pubmed/fdab316

Brusin, C., Ronnell, V. M. A., & Botha, E. (2021). Exploring fertility in the context of culture. In: Preconception health and care: handbook for education. Tampereen ammattikorkeakoulu.

Cameron, A. C., & Trivedi, P. K. (2010). Microeconometrics Using Stata. Stata Press.

Castiglione, D., Van Deth, J. W., & Wolleb, G. (2008). The handbook of social capital. Oxford University Press on Demand.

Chan, K. H., Wright, N., Xiao, D., et al. (2022). Tobacco smoking and risks of more than 470 diseases in China: A prospective cohort study. The Lancet Public Health, 7(12), e1014–e1026.

Chua, B. L., Al-Ansi, A., Lee, M. J., et al. (2020). Impact of health risk perception on avoidance of international travel in the wake of a pandemic. Current Issues in Tourism, 24(7), 985–1002. https://doi.org/10.1080/13683500.2020.1829570

Chuang, Y. C., & Chuang, K. Y. (2008). Gender differences in relationships between social capital and individual smoking and drinking behavior in Taiwan. Social Science & Medicine, 67(8), 1321–1330. https://doi.org/10.1016/j.socscimed.2008.06.033

Chui, A. C. W., & Kwok, C. C. Y. (2007). National culture and life insurance consumption. Journal of International Business Studies, 39(1), 88–101. https://doi.org/10.1057/palgrave.jibs.8400316

Dionne, G. (2013). Handbook of Insurance. Springer New York. https://doi.org/10.1007/978-1-4614-0155-1

Dippel, C., Ferrara, A., & Heblich, S. (2020). Causal mediation analysis in instrumental-variables regressions. The Stata Journal: Promoting Communications on Statistics and Stata, 20(3), 613–626. https://doi.org/10.1177/1536867x20953572

Doiron, D., Jones, G., & Savage, E. (2007). Healthy, wealthy and insured? The role of self-assessed health in the demand for private health insurance. Health Economics, 17(3), 317–334. https://doi.org/10.1002/hec.1267

Ehrlich, I., & Becker, G. S. (1992). Market insurance, self-insurance, and self-protection. In: Foundations of Insurance Economics. Springer.

Fei, X., Hamilton, G. G., & Wang, Z. (1992). From the soil, the foundations of Chinese society: A translation of Fei Xiaotong's Xiangtu Zhongguo, with an introduction and epilogue. University of California Press.

Gaganis, C., Hasan, I., Papadimitri, P., et al. (2019). National culture and risk-taking: Evidence from the insurance industry. Journal of Business Research, 97, 104–116. https://doi.org/10.1016/j.jbusres.2018.12.037

Giordano, G. N., & Lindstrom, M. (2010). The impact of social capital on changes in smoking behaviour: a longitudinal cohort study. The European Journal of Public Health, 21(3), 347–354. https://doi.org/10.1093/eurpub/ckq048

Gong, W., Zhu, M., Gürel, B., et al. (2021). The Lineage Theory of the Regional Variation of Individualism/Collectivism in China. Frontiers in Psychology, 11. https://doi.org/10.3389/fpsyg.2020.596762

Hansen, L. P. (1982). Large Sample Properties of Generalized Method of Moments Estimators. Econometrica, 50(4), 1029. https://doi.org/10.2307/1912775

Hawe, P., & Shiell, A. (2000). Social capital and health promotion: A review. Social Science & Medicine, 51(6), 871–885. https://doi.org/10.1016/S0277-9536 (00)00067-8

Ho, C. Y. (2016). Better health with more friends: The role of social capital in producing health. Health Economics, 25(1), 1. https://doi.org/10.1002/hec.3131

Hollard, G., & Sene, O. (2016). Social capital and access to primary health care in developing countries: Evidence from Sub-Saharan Africa. Journal of Health Economics, 45, 1–11. https://doi.org/10.1016/j.jhealeco.2015.10.004

Huston, S. J. (2010). Measuring Financial Literacy. Journal of Consumer Affairs, 44(2), 296–316. https://doi.org/10.1111/j.1745-6606.2010.01170.x

Kawachi, I., & Berkman, L. (2000). Social Cohesion, Social Capital, and Health. Social Epidemiology, 174–190. https://doi.org/10.1093/oso/9780195083316.003.0008

Kim, J. H., & Choi, I. (2019). Choosing the Level of Significance: A Decision-theoretic Approach. Abacus, 57(1), 27–71. https://doi.org/10.1111/abac.12172

Ko, H., Kim, H., Yoon, C., et al. (2018). Social capital as a key determinant of willingness to join community-based health insurance: a household survey in Nepal. Public Health, 160, 52–61. https://doi.org/10.1016/j.puhe.2018.03.033

Lin, N., Cook, K. S., & Burt, R. S. (2001). Social capital: Theory and research. Aldine de Gruyter.

Mahalik, J. R., Burns, S. M., & Syzdek, M. (2007). Masculinity and perceived normative health behaviors as predictors of men's health behaviors. Social Science & Medicine, 64(11), 2201–2209. https://doi.org/10.1016/j.socscimed.2007.02.035

Meng, Q., Fang, H., Liu, X., et al. (2015). Consolidating the social health insurance schemes in China: Towards an equitable and efficient health system. The Lancet, 386(10002), 1484–1492. https://doi.org/10.1016/S0140-6736 (15)00342-6

Mladovsky, P., & Mossialos, E. (2008). A Conceptual Framework for Community-Based Health Insurance in Low-Income Countries: Social Capital and Economic Development. World Development, 36(4), 590–607.

Moorman, C., & Matulich, E. (1993). A Model of Consumers' Preventive Health Behaviors: The Role of Health Motivation and Health Ability. Journal of Consumer Research, 20(2), 208–228.

Mouw, T. (2006). Estimating the Causal Effect of Social Capital: A Review of Recent Research. Annual Review of Sociology, 32(1), 79–102. https://doi.org/10.1146/annurev.soc.32.061604.123150

Nahapiet, J., & Ghoshal, S. (1998). Social Capital, Intellectual Capital, and the Organizational Advantage. Academy of Management Review, 23(2), 242–266.

Nauenberg, E., Laporte, A., & Shen, L. (2011). Social capital, community size and utilization of health services: A lagged analysis. Health Policy, 103(1), 38–46. https://doi.org/10.1016/j.healthpol.2010.12.006

Nsiah-Boateng, E., & Aikins, M. (2018). Trends and characteristics of enrolment in the National Health Insurance Scheme in Ghana: A quantitative analysis of longitudinal data. Global health research and policy, 3(1), 1–10.

Portes, A. (2000). The Two Meanings of Social Capital. Sociological Forum, 15(1), 1–12.

Schwartz, S. H. (1990). Individualism-Collectivism: Critique and Proposed Refinements. Journal of Cross-Cultural Psychology, 21(2), 139–157. https://doi.org/10.1177/0022022190212001

Shen, Y., Yeatts, D. E., Cai, T., et al. (2013). Social Capital and Self-Rated Health Among Middle-Aged and Older Adults in China. Research on Aging, 36(4), 4. https://doi.org/10.1177/0164027513505624

Shi, Z., He, P., Zhu, D., et al. (2022). Changes in health care utilization and financial protection after integration of the rural and urban social health insurance schemes in Beijing, China. BMC Health Services Research, 22(1), 1226. https://doi.org/10.1186/s12913-022-08602-1

Staiger, D., & Stock, J. H. (1994). Instrumental variables regression with weak instruments. Econometrica, 65(3), 557–586.

Sterling, T., & Weinkam, J. (1990). The confounding of occupation and smoking and its consequences. Social Science & Medicine, 30(4), 457–467. https://doi.org/10.1016/0277-9536 (90)90348-V

Stock, J. H., & Yogo, M. (2002). Testing for Weak Instruments in Linear IV Regression. Available online: https://scholar.harvard.edu/files/stock/files/testing_for_weak_instruments_in_linear_iv_regression.pdf (accessed on 8 January 2024).

Stone, W. (2001). Measuring social capital. Australian Institute of Family Studies, Research Paper, 24.

Strauss, J., & Thomas, D. (2007). Health over the life course. Handbook of development economics, 4, 3375–3474.

Tani, Y., Isumi, A., Doi, S., & Fujiwara, T. (2022). Number of siblings and social capital among parents rearing schoolchildren:

Results from the A-CHILD study. Journal of Epidemiology, JE20210510.

van den Akker, M., Buntinx, F., & Knottnerus, J. A. (1996). Comorbidity or multimorbidity: What's in a name? A review of literature. European Journal of General Practice, 2(2), 65–70. https://doi.org/10.3109/13814789609162146

Wang, T., Sun, Y., & Liao, S. (2022). Physical self matters: How the dual nature of body image influences smart watch purchase intention. Frontiers in Psychology, 13, 875.

Wasserstein, R. L., & Lazar, N. A. (2016). The ASA Statement on p-Values: Context, Process, and Purpose. The American Statistician, 70(2), 129–133. https://doi.org/10.1080/00031305.2016.1154108

Woolcock, M., & Narayan, D. (2000). Social capital: Implications for development theory, research, and policy. The world bank research observer, 15(2), 225–249.

Xu, M., & Yang, W. (2021). Who will drop out of voluntary social health insurance? Evidence from the New Cooperative Medical Scheme in China. Health Policy and Planning, 36(7), 1013–1022. https://doi.org/10.1093/heapol/czab017

Ying, X. H., Hu, T. W., Ren, J., et al. (2007). Demand for private health insurance in Chinese urban areas. Health Economics, 16(10), 1041–1050.

Yip, W., Subramanian, S. V., Mitchell, A. D., et al. (2007). Does social capital enhance health and well-being? Evidence from rural China. Social Science & Medicine, 64(1), 1. https://doi.org/10.1016/j.socscimed.2006.08.027

Zhang, L., Wang, H., Wang, L., & Hsiao, W. (2006). Social capital and farmer's willingness-to-join a newly established community-based health insurance in rural China. Health Policy, 76(2), 233–242. https://doi.org/10.1016/j.healthpol.2005.06.001

Zhao, Y., Hu, Y., Smith, J. P., et al. (2014). Cohort profile: The China health and retirement longitudinal study (CHARLS). International journal of epidemiology, 43(1), 61–68.

Zhou, X., Liu, D. (2022). Dilemmas of social insurance enrollment. Available online: https://weekly.caixin.com/2022-01-22/101833513.html (accessed on 7 January 2024).