The Fifth Biennial Workshop on Social Capital and Health

How Does Social Capital Matter to Health Status? ——Evidence from China

Authors: Gordon G. Liu, Peking University
Xindong Xue, Zhongnan University of Economics and Law
Chenxi Yu, University of North Carolina at Chapel Hill

Toronto,Canada

Oct. 6, 2014

Outline

- Research background
- Literature review
- Data, variables and descriptive statistics
- Identification strategy
- Results and discussion
- Conclusion

Research Background

- Large body of literature on this topic, but most of them suffer from causality problem.
- This question is highly policy-relevant.
- What about the evidence from China?

Literature Review

- Social capital definition
  - usually defined as “features of social organization such as networks, norms, and social trust that can facilitate coordination and cooperation for mutual benefit” （Putnam, 1993）.
- Social capital measurement
  - Cognitive vs. structural
  - Bonding, bridging and linking
- Construction of social capital index
  - Principal component analysis
  - Standardized Z-index

- The current literature defines social capital at three levels: national, community and individual.
- National level studies,
  - Kawachi *et al*. (1997)
  - Hallowell and Putnam (2004)
  - Kennelly, O'Shea and Garvey (2003)

- Community level studies
  - Islam (2006)
  - Scheffler (2007)
  - Poortinga (2006)
- Individual level studies
  - Rose (2000)
  - Hyyppa and Maki (2003)

- But, there are several exceptions, some more recent literature employ IV to identify the causal link between social capital and health .
  - Folland(2007)
  - D'Hombres et al.(2010,2011)
  - Ronconi et al.(2010)
  - Kim(2011)
- The validity of IV? Finding a good IV is NOT easy!

- Studies on China is relatively few.
  - Yip et al.(2007)
  - Hongmei Wang *et al*.(2009)
- The above two studies just find the positive relationship between social capital and health.

Our Study

- Employ CHARLS 2008 and 2012 panel data to control unobserved heterogeneity, thus identifying causal relationship between social capital and health.
- Use more objective and comprehensive measurement of physical and mental health (ADL index and CES-D index)
- Investigate the heterogeneous effects of social capital on health among different sub-populations by gender, age and area of residence.

Data

- Data
  - China Health and Retirement Longitudinal Survey (CHARLS) 2008 and 2012 panel data, with 2008 the first survey, 2012 the resurvey.
  - Respondents are 45 years old in both urban and rural areas, from Zhejiang and Gansu Province
  - Rich information on individual and community.
  - Our final sample includes 5058 observations

Dependent variables

- ADL index(continous)
  - used by Strauss(1993),Gertler and Gruber(2002),Morefied(2010) ,Bratti and Mendola(2014)
  - More objective than self-reported health status and less likely to be affected by individual response scale difference
  - Has been validated both in the US and in East Asian countries(Andrews et al. 1986;Guralnik, et al,1989;Ju and Jones,1989).
  - CHARLS asked respondent the following 9 questions on individual's ADL

(1)Do you have any difficulty with running or jogging about 1 Km?

(2)Do you have difficulty …Walking 1 km…?

(3)Do you have difficulty … Walking 100 metres…?

(4)Do you have difficulty …Getting up from a chair after sitting for a long period…

(5)Do you have difficulty …Climbing several flights of stairs without resting…?

(6) Do you have difficulty …Stooping, kneeling, or crouching…?

(7) Do you have difficulty …Reaching or extending your arms above shoulder level…?

(8) Do you have difficulty …Lifting or carrying weights over 10 jin, like a heavy bag of groceries…

(9)Do you have difficulty …Picking up a small coin from a table…?

- The possible answers are: “No, I don’t have any difficulty , “I have difficulty but can still do it” ,“Yes, I have difficulty and need help.” and “I can not do it”.
- Follow Gertler and Gruber(2002) ‘s approach,
  - codes1,2,3,4 to the first, second, third and fourth answers respectively
  - sum all these answers of each individual

$$ADL = \left(\frac{score - Minscore}{Maxscore - Minscore} \right)$$

- CES-D index
  - CHARLS administered 10 items that typically comprise the CES-D Scale
  - respondents were instructed to indicate the frequency of experiencing certain feelings or emotions during the past week
  - Possible responses are: “rarely or none of the time” (=0); “some or a little of the time” (=1); “occasionally or a moderate amount of the time” (=2); and “most or all of the time” (=3)
  - Following Duncan and Rees (2005), responses to the 10 items were summed to produce a score between 0 and 30

Independent variables

- Social capital index
  - Following Sundqusit *et al.*(2004) and Ronconi *et al.* (2010) 'approach, we construct a standardized social capital index.

Survey Questions	Definition
Did you participate in the following activities in the past month?	
s1: Volunteering or philanthropy activities	Yes = 1, No = 0
s2: Taking care of the elderly or disabled that you don't live with free of charge	Yes = 1, No = 0
s3: Offering help to relatives, friends or neighbors that you don't live with free of charge	Yes = 1, No = 0
s4: Going to school or attending training courses	Yes = 1, No = 0
s5: Visiting friends	Yes = 1, No = 0
s6: Playing mahjoon, chess, poker and going to community activity center	Yes = 1, No = 0
s7: Participating in tai chi, dancing and other group activities	Yes = 1, No = 0
s8: Participating in activities organized by community organizations	Yes = 1, No = 0

- Other independent variables include age,gender,living place, education, marital status insurance, health behavior, household characteristics and community characteristics.

Summary statistics of variables

Variables		N.obs.	Mean	S.D.
Dependent variables				
	ADL index	5,058	0.247	0.188
	CES-D score	3,877	8.01	6.26
Independent variables				
	Social capital index	5,058	0.081	0.118
Demographic				
	Age	5,058	60.57	10.48
	Female	5,058	0.517	0.5
	Dwelling in urban area	5,058	0.221	0.415
Education				
	Illiterate(reference group)	5,058	0.428	0.495
	Primary	5,058	0.360	0.480
	Secondary	5,058	0.197	0.397
	University	5,058	0.013	0.113
Marital status				
	Married(reference group)	5,058	0.832	0.374
	Divorced	5,058	0.013	0.112
	Widowed	5,058	0.144	0.351
	Unmarried	5,058	0.011	0.105

Insurance status				
	No medical insurance(reference group)	5058	0.052	0.221
	Urban employee medical insurance	5058	0.104	0.306
	Urban resident medical insurance	5058	0.048	0.214
	New rural cooperative medical insurance	5058	0.730	0.446
	Free medical insurance	5058	0.018	0.131
	Medical aid	5058	0.0006	0.024
	Commercial medical insurance	5058	0.022	0.148
Health behavior				
	Ever smoke	5058	0.351	0.477
	Ever drink	5058	0.397	0.489
Household characteristics				
	household size	5058	3.205	1.613
	Log of household income per capita	5058	7.851	2.568
	Connected to running water	5037	0.785	0.411
	Connected to sewer	4565	0.449	0.497
	Connected to telephone	5058	0.620	0.486
	House owned	5058	0.897	0.304
	Log of house area	4730	4.560	0.681
Community characteristics				
	Number of community hospitals and clinics	5058	1.745	2.489
	Number of community recreational centers	4501	6.096	3.419
	Distance to the nearest bus station	4533	2.117	5.279
	Has road passing through	4565	0.943	0.232

Identification Strategy

- We begin with a simple regression using two waves of CHARLS data to estimate:

$$H_i = \alpha_0 + \alpha_1 SC_i + \delta X_i + \gamma C_i + \varepsilon_i$$

- In order to control for time-invariant unobservables, we estimate a model with individual fixed effects as follows

$$H_{it} = \alpha_0 + \alpha_1 SC_{it} + \delta X_{it} + \gamma C_{it} + \mu_i + \varepsilon_{it}$$

- Although the above equation can eliminate bias caused by time-invariant unobervables, it cannot address the problems of reverse causality and time-varying unobservables. Therefore, we employ an instrumental variables (2SLS) identification strategy.
- The instrument is the community average of individuals' social capital index. The justification for the use of this instrument was discussed in details by d' Hombres et al. (2011)

Regression results: OLS regression

	ADL		CES-D	
	Coef.	Robust S.E	Coef.	Robust S
Social capital index	-0.132***	0.020	-3.516***	0.756
Age	0.005***	0.000	0.009	0.018
Female	0.050***	0.009	1.467***	0.323
Dwelling in urban area	0.003	0.009	-0.196	0.391
Primary	-0.019***	0.007	-0.956***	0.272
Secondary	-0.014*	0.008	-1.386***	0.403
University	-0.038*	0.022	-2.089***	0.697
Divorced	0.009	0.019	1.152	0.773
Widowed	0.026**	0.010	1.933***	0.453
Unmarried	0.024	0.032	6.169***	1.454

Urban employee medical insurance	0.016	0.011	0.878*	0.494
Urban resident medical insurance	0.030**	0.015	1.395**	0.552
New rural cooperative medical insurance	0.005	0.011	0.264	0.413
Free medical insurance	0.037	0.023	0.660	0.721
Medical aid	-0.021*	0.012	2.291**	1.084
Commercial medical insurance	-0.003	0.015	-1.181**	0.481
Ever smoke	0.000	0.009	0.706**	0.336
Ever drink	-0.009	0.006	-0.449*	0.232
household size	0.008***	0.002	0.130	0.089
Log of household income per capita	-0.003***	0.001	-0.153***	0.048
Connected to running water	-0.007	0.007	0.166	0.308
Connected to sewer	-0.022**	0.010	-0.790	0.578
Connected to telephone	-0.003	0.006	-0.196	0.238
House owned	0.003	0.008	0.567	0.411
Log of house area	-0.015***	0.005	-0.674***	0.221
Number of community hospitals	0.003*	0.002	0.205***	0.074
Number of community centers	-0.006***	0.002	-0.314***	0.079
Distance to the nearest bus station	0.001	0.001	0.074**	0.034
Has road passing through	-0.045**	0.021	-0.474	0.941
Year2012	0.122***	0.007	-0.348	0.263
Intercept	0.006	0.046	12.825***	1.865
N				3215

Note: Robust standard errors corrected for clustering on communities ;
*;**;*** represent significance at 10%, 5% and 1% levels respectively.*

Individual Fixed Effect

	ADL index				CES-D			
	FE		RE		FE		RE	
	Coef.	Robust S.E	Coef.	Robust S.E	Coef.	Robust S.E	Coef.	Robust S.E
Social capital index	-0.090***	0.032	-0.142***	0.023	-2.992***	0.729	-0.124	1.292
Age	0.027***	0.002	0.006***	0.000	1.431***	0.325	0.764	1.510
Female	0.233***	0.049	0.054***	0.009	0.013	0.017	0.072	0.121
Dwelling in urban area	0.050***	0.015	0.041***	0.016	-0.143	0.363	0.578	0.540
Primary	-0.010	0.012	-0.016**	0.007	-1.156***	0.275	-1.887***	0.655
Secondary	-0.032	0.020	-0.012	0.008	-1.591***	0.394	-2.318**	1.113
University	-0.040	0.032	-0.033	0.028	-2.353***	0.704	-0.050	2.096
Divorced	-0.005	0.034	0.001	0.020	0.867	0.800	0.748	1.962
Widowed	0.041	0.036	0.018*	0.011	1.904***	0.450	2.462	1.494
Unmarried	0.063	0.043	0.013	0.032	6.219***	1.492	15.085***	1.976
Urban employee medical insurance	-0.004	0.019	0.003	0.013	0.746	0.475	1.772**	0.744
Urban resident medical insurance	0.011	0.026	0.027	0.020	1.213**	0.548	0.749	1.256
New rural cooperative medical insurance	0.008	0.016	0.013	0.013	0.261	0.412	0.581	0.542
Free medical insurance	0.029	0.027	0.025	0.021	0.917	0.731	2.671**	1.174
Medical aid	0.138***	0.027	0.002	0.040	2.331**	1.089	/	/
Commercial medical insurance	0.035	0.024	0.003	0.017	-1.135**	0.498	-1.019	0.912
Ever smoke	0.006	0.020	-0.003	0.010	0.685**	0.337	-0.008	0.715
Ever drink	0.014	0.012	-0.002	0.006	-0.408*	0.225	0.100	0.401
household size	0.007*	0.004	0.008***	0.002	0.122	0.085	0.188	0.144
Log of household income	-0.000	0.002	-0.002**	0.001	-0.115**	0.045	0.076	0.060

per capita								
Connected to running water	-0.022***	0.008	-0.058***	0.007	0.150	0.302	-0.118	0.381
Connected to sewer	0.016	0.014	0.007	0.013	-0.998*	0.586	-0.431	1.088
Connected to telephone	-0.023**	0.010	-0.027***	0.008	-0.274	0.233	-0.068	0.469
House owned	-0.028*	0.016	-0.004	0.009	0.331	0.396	-0.628	0.584
Log of house area	-0.005	0.007	-0.013***	0.005	-0.003**	0.001	-0.001	0.001
Number of community hospitals	0.003	0.002	0.002	0.002	0.219***	0.066	0.308***	0.056
Number of community centers	-0.003	0.003	-0.012***	0.002	-0.266***	0.073	0.071	0.111
Distance to the nearest bus station	-0.000	0.001	0.001	0.001	0.064**	0.030	0.009	0.028
Has road passing through	-0.015	0.047	-0.034*	0.018	-0.666	0.846	0.754	1.171
Year2012	-1.456***	0.189	0.050	0.046	-0.288	0.250	-0.357	0.609
Intercept	-0.090***	0.032	-0.142***	0.023	9.896***	1.473	1.486	7.082
Hausman Test[*p*-value]	357.04[0.000]				77.27[0.000]			
N.observations	3920				3215			
No.individuals	2511				2211			

Note:Hausman test for fixed vs. random effects, computed on the models without robust standard errors.

,,*** represent significance at 10%, 5% and 1% levels respectively.*

IV result

Table 5 2SLS regression of the effect of social capital on ADL

First stage				
Dependent variable	social capital index			
	IV FE		IV RE	
	Coef.	Robust S.E	Coef.	Robust S.E
Average community social capital	0.784***	0.093	0.83***	0.049
Second stage				
Dependent variable	ADL index			
	IV FE		IV RE	
	Coef.	Robust S.E	Coef.	Robust S.E
Social capital index	-0.225***	0.055	-0.271***	0.084***
Hausman Test[*p*-value]	42.39[0.04]			
N.Obs.	3920			
N.groups	2511			

*Note: we also control for the variables listed in Table 4. *,**,*** represent significance at 10%, 5% and 1% levels respectively The same hereinafter for the following tables.*

Table 6 2SLS regression of the effect of social capital on CES-D

First stage				
Dependent variable	social capital index			
	IV FE		IV RE	
	Coef.	Robust S.E	Coef.	Robust S.E
Average community social capital	0.893***	0.055	0.813***	0.111
Second stage				
Dependent variable	CES-D			
	IV FE		IV RE	
	Coef.	Robust S.E	Coef.	Robust S.E
Social capital index	-10.27***	3.11	3.47	6.21
Hausman Test[*p*-value]	392.91 [0.000]			
N.Obs.	3215			
N.groups	2211			

Heterogeneous effects

Table 7 IV estimation of the Heterogeneous effects of social capital on ADL index

	Model 1		Model 2		Model 3	
	IV FE	IV RE	IV FE	IV RE	IV FE	IV RE
	Coef	Coef.	Coef	Coef.	Coef	Coef.
Social capital index	-0.079***	-0.129***	-0.049	-0.149***	-0.067**	-0.093***
	(0.04)	(0.025)	(0.035)	(0.027)	(0.038)	(0.024)
Female*social capital index	-0.022	-0.028				
	(0.051)	(0.033)				
Urban*social capital index			-0.115*	0.019		
			(0.062)	(0.049)		
Age65*social capital index					-0.106**	-0.242***
					(0.046)	(0.048)
Hausman Test[*p*-value]	356.62[0.000]		360.91[0.000]		355.09[0.000]	

Table 8 IV estimation of the Heterogeneous effects of social capital on CES-D

	Model 1		Model 2		Model 3	
	IV FE	IV RE	IV FE	IV RE	IV FE	IV RE
	Coef	Coef.	Coef	Coef.	Coef	Coef.
Social capital index	-2.438***	-2.28	-0.107	-2.32***	-2.531**	0.3***
	(0.862)	(1.501)	(1.752)	(0.872)	(0.819)	(1.485)
Female*social capital index	-3.389***	-1.098				
	(1.082)	(1.29)				
Urban*social capital index			0.078	-1.575		
			(2.6377)	(1.231)		
Age65*social capital index					-2.218	-0.259
					(1.685)	(3.367)
Hausman Test[*p*-value]	83.40[0.000]		77.16[0.000]		76.71[0.000]	

Conclusion

- Promoting health can be achieved by increasing individual's social capital.
- How to form social capital?
- Attention should be paid to heterogeneous effects of social capital on health.

Future plans

- Quasi-experimental way to identify the causal relationship
  - China's forced immigration due to water irrigation project
- Investigate the mechanism underlying this relationship
- Explore the ways to increase the social capital of Chinese populations

THANK YOU!