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EERI Research Paper Series, No. 29/2010

Provided in Cooperation with:
Economics and Econometrics Research Institute (EERI), Brussels

Suggested Citation: Yamamura, Eiji (2010) : Different effects of social capital on health status among residents: evidence from modern Japan, EERI Research Paper Series, No. 29/2010, Economics and Econometrics Research Institute (EERI), Brussels

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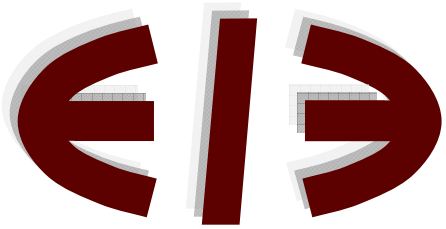
EERI Research Paper Series No 29/2010

ISSN: 2031-4892



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Different effects of social capital on health status among residents: evidence from modern Japan

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Eiji Yamamura

Abstract

This paper aims to explore how social capital is related to self-rated health status in Japan and how this relationship depends on the extent to which a person is embedded into the community. This study used data from 3079 adult participants in Japan's Social Policy and Social Consciousness (SPSC) survey conducted in 2000. Controlling for unobserved city size- and area-specific fixed effects, I find through Ordered Probit estimations that social capital has a significantly positive effect on health status for long-time but not for short-time residents. Results also suggested that the experience of divorce is negatively associated with health status for long- time but not short-time residents. People can enjoy a social network, a kind of social capital, if they are a member of such a network. Nevertheless, people appear to be negatively influenced if they are excluded from networks. Such positive and negative effects of social capital are more obvious when people are more deeply integrated into a community. Empirical study provided evidence that social capital and socio-economic effects on health status are significantly influenced by the extent to which respondents are integrated into a community.

JEL classification: I19; Z13; R58

Key Words: social capital; health status

1. Introduction

It is widely acknowledge that social capital is associated with various facets of life (Putnam 2000). In the field of health related issues, empirical analyses have been conducted that suggest social capital has a significant influence on human behavior and its outcome (e.g. Costa-Font and Mladovsky 2008; Islam 2008; Scheffler and Brown 2008)[1]. The investigation of the relationship between health status and social capital is considered a major topic. Some works provided evidence that there is positive relationship between health status and social capital (e.g. Kawachi et al. 1997; 1999; Islam et al. 2006; Petrou and Kupek). However, it is also reported that a positive relationship does not generally hold (Iversen 2008). The instability of the social capital effect appears to be partly explained by the characteristics of social capital. Putnam (2000) noted that social capital has not only positive but also negative influences on the quality of life. Once a person suffers ostracism and thus is excluded from a social network considered as social capital, that person would be socially and psychologically injured in a way that social capital would be negatively associated with health. If social capital not only improves but also deteriorates health, the effect of social capital on health would not be obvious.

In a case study of Japan, social capital made a greater contribution to a decrease in suicide of females than that of males, since the degree of a female's social involvement in neighborhoods is higher than a male's (Yamamura 2009). The effect of social capital is thought to vary according to the extent to which individuals are embedded in the community. A question naturally arises; under what conditions do social capital lead to deterioration of health? Previous works have paid little attention to this question. Thus this paper aims to examine social capital effects on health by comparing the self-rated health of long-time residents in a community with those of others. For this purpose, I use individual level data from Japan that contains various socio-economic variables.

2. Methods

2.1 Data

The empirical analysis here is based on individual level data covering information such as self-rated health status, demographic (age and sex) and economic (income,

[1] Besides empirical research, Folland (2006; 2008) constructed a theoretical economic model connecting social capital with health.

experience of bankruptcy) status, and social capital index. This data was constructed from the Social Policy and Social Consciousness (SPSC) survey conducted in all parts of Japan in 2000[2]. 5 000 adults (aged 20 years or older) were invited to participate in a survey involving stratified two-stage random sampling. The survey collected data on 3991 adults; a response rate of 79.8 %[3]. Sample points are divided into 11 areas. Furthermore, in each area, according to its population size, cities and towns are divided into the 4 groups; the 13 metropolitan cities, cities with 200 000 people or greater, cities with 100 000 people or greater, and towns and villages.

2.2 Estimation method

Variable definitions, means and standard deviations are in Table1. The dependent variable is the self-rated health status, which is measured using the question "How would you describe your current health during these past three months?" The responses could run from 0 (not good) to 4 (very good). Following the discussion in Putnam (2000), the degree of civic engagement is considered as social capital in this research. Thus social capital was measured using questions "Are you actively involved in volunteer activity?" and "Are you actively involved in the activity of a neighborhood association?" The responses are scored as 1 (very actively or somewhat involved) or 0 (not actively involved or not involved at all)[4].

Influence from others on reduction of smoking appears stronger when people live more closely and cohesively (Yamamura 2007). It follows from this that the duration of residence can be considered to capture the degree of integration into a community in the context of health status. The estimates in the empirical model used Ordered Probit analysis. First, I conducted estimations using all samples. Then, to compare effects of

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[2] The data for this secondary analysis, "Social Policy and Social Consciousness survey (SPSC), Shogo Takekawa," was provided by the Social Science Japan Data Archive, Information Center for Social Science Research on Japan, Institute of Social Science, The University of Tokyo.

[3] Respondents did not respond fully to all questions; therefore, samples used for regression estimations were 3079.

[4] Existing literature has used other measures as social capital. For instance, measures of trust and reciprocity and that of perceived social support have been used (Petrou and Kupek 2008). Laporte et al (2008) categorized social capital as community- level social capital based on employment levels in religious and community based organizations and individual-level social capital measured by self-reported connectedness to community. Both community- and individual-level social capitals need to be examined. It should, however, be noted that the effects of social capital in this paper capture only individual level social capital because of the lack of data.

the duration of residence, samples were split into those who had resided for more than 20 years at their current address and those who had resided for less than 20 years. The former were defined as long-time residents and the latter as others. Separate estimations were carried out using these split samples.

The estimated function takes the following form:

$$HEALT_{imn} = \alpha_1 SC1_{imn} + \alpha_2 SC2_{imn} + \alpha_3 CHILD_{imn} + \alpha_4 DIV_{imn} + \alpha_5 MARRI_{imn} + \alpha_6 EQUAL_{imn} + \alpha_7 AGE_{imn} + \alpha_8 INCOM_{imn} + \alpha_9 BANKRPT_{imn} + \alpha_{10} MALE_{imn} + \alpha_{11} UNIV_{imn} + e_m + f_n + u_{imn},$$

where $HEALT_{imn}$ represents the dependent variable in resident i, city size m and area n. α's represents regression parameters. e_m and f_n are unobservable city size and area specific effects, which are controlled by dummy variables. u_{imn} represents the error term.

In works such as Kamachi et al 1997, 1999; Islam et al 2006; Petrou and Kupek 2008), social capital makes a contribution to the improvement of health status. Hence, proxies for social capital such as SC1 and SC2 are expected to take a positive signs. Someone with children is likely to have opportunities to interact with other parents through PTA meetings and various community association events for children, resulting in the accumulation of social capital. CHILD can thus also be considered as a proxy for social capital, leading to the sign of CHILD becoming positive.

It appears generally considered that marriage improves health status (Waite and Gallagher 2000; Waite et al. 2009). Hence the sign for MARRI is predicted to become positive. On the other hand, the experience of divorce is thought to damage, psychologically and economically, those involved and so divorce can be thought of as having a detrimental influence on health (e.g., Amato 2000; Lorenz et al 2006; Yamamura 2009). DIV is expected to take a negative sign. This damage caused by divorce appears to partly depend on the circumstance of where one resides. Divorce appears to change the interpersonal network since a married person's network is not only formed from one's own colleagues but also by one's spouse's. If a couple with a network within a neighborhood community divorce, they would lose not only their spouse but also their spouse's network. . As a consequence, DIV is anticipated to have a negative effect on health in long-time residents.

Income inequality reduces health status (Kawachi et al. 1997; Kondo et al. 2008). If this is the case, income equality should improve health status. So the expected sign of

EQUAL, which is measure of income equality, is positive[5]. Several control variables are included to capture individual characteristics: ages, household income, experience of bankruptcy, and male and university graduation dummies.

3. Results

Table 2 presents the results of estimations using all samples. From Table 2, it can be seen that SC1, SC2 and CHILD yield positive signs and almost, with the exception of SC1 in column(1), statistically significance. Hence, the results of Table 2 strongly support my predictions that social capital has an important role in improving health status. The model is estimated using the Ordered Probit method because the dependent variable is ordered. When the coefficient takes a positive sign, a positive change in the independent variable decreases the probability of a lower ranked outcome and increases the probability of the highest ranked outcome. However, "The marginal effects of the regressors on the probability are not equal to the coefficients" (Greene 1997, p.927). Therefore, I encounter difficulties interpreting coefficients. Instead of a coefficient, the marginal effects can be calculated in the each category of dependent variable (Greene 1997, pp.927-931). In this paper, I compute the marginal effects for the highest category of health status for key variables such as SC1 and SC2[6]. These marginal effects, shown in angle brackets, imply the probability that a respondent chooses "very good" as a response to the question about the health status[7]. For instance, the marginal effect of SC1 is 0.03 in column (2) and that of SC2 is 0.05 in column (3). I can interpret this as suggesting that those who are involved in volunteer activities are 3 % more likely to choose "very good" than uninvolved others, whereas those who are involved in an activity of their neighborhood association are 5 % more likely to choose "very good" than uninvolved others. As for other control variables, the signs of DIV and MARRI are negative and positive, respectively, which is consistent with the anticipation despite being not statistically significant.

Table3 shows the results when samples are divided into those who have resided

[5] I use subjective perception about income equality since quantitative data is not available.
[6] I obtained marginal effects for all independent variables for each category of health status but do not present them to save space.
[7] I calculated marginal effects for other categories These are consistent with the results for the highest category, but I have not reported them to save space. These results are available upon request.

longer or less than 20 years. Columns (1)-(3) show the results for long-time residents and columns (4)-(6) for short-time residents. Looking at the first and second rows reveals that proxies for social capital (SC1 and SC2) have positive signs and are almost statistically significant at the 1 % level for long-time residents, whereas these signs are not stable and are not significant for other residents. Moreover, for long-time residents, the marginal effects of SC1 0.04 in column(2) and that of SC2 is 0.06 in column (3), which are larger than SC1 in column (2) and SC2 in column (3) of Table 2. This implies that the marginal effects of social capital for long-time residents are larger than those for all respondents. From the third row, it can be seen that the results of CHILD indicate significant positive signs for long-time residents, but unpredicted negative signs for other residents. From this, I derived the argument that social capital makes a contribution to the improvement of health status only when people reside in a community for long-time.

Turning now to DIV, I find that the signs for DIV become significantly negative for long-time residents but not for others. This implies that divorce has an external negative effect on health through exclusion from a social network when the relationship within a community has been long term. On the other hand, MARRI is indicated as negative for long-time residents but significantly positive for other residents. It follows from this that long-term personal relationships with neighbors are negatively associated with divorce, but not positively with marriage. Concerning other variables, the results are almost in line with intuition and there are no significant differences, with the exception of MALE, between long-time and other residents[8].

Overall, what is seen from the empirical examination is mostly consistent with previous reports in Western countries such as the United States (Kawachi et al., 1997, 1999), Canada (Veenstra 2000) and Sweden (Islam et al., 2008). This paper examines the effects of social capital on general health status. However, the empirical work on United States data revealed the effects of volunteer group membership on cause-specific mortality rates, such as for heart disease, malignant neoplasms, cerebrovascular disease, and unintentional injuries (Kawachi et al.1997). The report from Sweden examined the effects of the election participation rate on mortality risk from cancer and cardiovascular mortalities, and suicide (Islam et al., 2008). It is interesting to observe

[8] EQUAL shows significantly positive signs for both long-time and for other residents, suggesting economic inequality deteriorates health status. Kawachi et al.(1997) argues that income inequality reduces social capital, leading to deterioration of health status. In this paper, such an effect is controlled by the inclusion of a proxy for social capital.

that social capital has an effect on all-cause mortality for males over 65 years old but not for females. Social capital is not only civic engagement or participation in community associations, but is also trust with a psychological dimension. Besides participation in clubs and associations, the effects of trust and identity on health have also been investigated (Kawachi et al.1997; Veenstra 2000). The contribution of the work here is as the first to present evidence that the effects of participation in social activities vary according to the length of residence.

4. Discussion

The effect of social capital on health appears to vary in accordance with the conditions confronting individuals. Furthermore, social capital is considered to have not only a positive influence but can also have a negative impact on health. Nevertheless, these issues have largely been overlooked in the field of health economics. For the purpose of investigating this issue, this paper explores how and the extent to which the effects of social capital (and socio economic factors) on self-rated health status are affected by the duration of residence in a community. For this purpose, individual-level data for Japan was used in this study. Major findings from the Ordered Probit estimations can be summarized as follows;

(1) Social capital has a significantly positive effect on health status for long-time residents, but not for short-time ones.

(2) Experience of divorce is negatively associated with health status for long-time residents, but an association is not observed for short-time residents.

From these conclusions, I can derive the argument that social capital and socio-economic effects on health status are influenced by the extent to which residents are integrated into a community. Japan is characterized by racial homogeneity, thus the informal norm that is formed through personal interactions remains effective to a certain extent, (Yamamura 2008). The community mechanism is characterized not only by reciprocity, enjoyed by members when they follow norms, but also by punishment (Reuben and van Winden 2008) or ostracism from which members suffer when they are act against norms (Hayami 2001). One of reasons for the different effects of socio-economic factors on health status might be related to community mechanisms.

The present research was limited to Japan, and the sample size of subjects used in the analyses was small. As such, the findings provided here cannot be easily generalized. To better verify the generality of the arguments presented here, a study comparing

similar data from other countries with different socio-cultural backgrounds needs to be conducted using larger sample sizes. These are issues remaining to be addressed in future studies.

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Table 1
Variable definitions and descriptive statistics

Variables	Definition	Mean	Standard deviation
HEALTH	The degree of self-rated general health status ranges from 0 (not good) to 4 (very good).	2.80	1.07
SC1	1 if one is involved in volunteer activity, otherwise 0.	0.33	0.47
SC2	1 if one is involved in an activity of a neighborhood association, otherwise 0.	0.43	0.49
CHILD	1 if one has a child, otherwise 0.	0.77	0.41
DIV	1 if one has experienced divorce, otherwise 0.	0.03	0.17
MARRI	1 if one has a spouse, otherwise 0.	0.75	0.43
EQUAL	1 if one thinks that income inequality in Japan is low at present, otherwise 0.	0.30	0.46
AGE	Age	49	15
INCOM	Household income [a]	6.52	4.19
BANKPT	1 if one (or a member of one's family) has experienced bankruptcy during the past three years, otherwise 0.	0.18	0.39
MALE	1 if one is male, otherwise 0.	0.47	0.49
UNIV	1 if one graduated from a university, otherwise 0.	0.15	0.36

Note: [a] Millions of yen

Table 2. Regression results on health status (Ordered Probit Estimation: All samples).

Variables	(1)	(2)	(3)
SC1	0.03	0.09**	
	<0.01>	<0.03>	
	(0.85)	(2.34)	
SC2	0.16**		0.17**
	<0.05>		<0.05>
	(3.58)		(4.19)
CHILD	0.14*	0.17**	0.14*
	(2.19)	(2.58)	(2.18)
DIV	-0.18	-0.19	-0.18
	(-1.49)	(-1.60)	(-1.49)
MARRI	0.001	0.01	0.005
	(0.01)	(0.22)	(0.01)
EQUAL	0.21**	0.21**	0.21**
	(4.89)	(5.01)	(4.91)
AGE	-0.01**	-0.01**	-0.01**
	(-11.7)	(-11.4)	(-11.7)
INCOM	0.02**	0.02**	0.02**
	(4.59)	(4.56)	(4.64)
BANKPT	-0.17**	-0.17**	-0.17**
	(-3.46)	(-3.45)	(-3.45)
MALE	0.11**	0.11**	0.11**
	(2.92)	(2.90)	(2.90)
UNIV	0.03	0.03	0.03
	(0.62)	(0.51)	(0.61)
Area[a]	YES	YES	YES
City size[a]	YES	YES	YES
Pseudo R- square	0.03	0.03	0.03
Sample size	3079	3079	3079

Notes: Numbers in parentheses are z-statistics obtained by robust standard error. Numbers in angle bracket are marginal effects calculated at the highest category. * and ** indicate significance at 5 and 1 percent levels, respectively (one-sided tests). a. YES means that dummy variables are included to control for area specific or city size specific effects.

Table 3.

Regression results on health status (Ordered Probit Estimation: Longtime residents vs Others).

Variables	(1) *Longer*	(2) *Longer*	(3) *Longer*	(4) *Others*	(5) *Others*	(6) *Others*
SC1	0.07	0.14**		-0.05	-0.03	
	<0.02>	<0.04>		<-0.01>	<-0.007>	
	(1.39)	(2.83)		(-0.66)	(-0.30)	
SC2	0.18**		0.21**	0.08		0.06
	<0.05>		<0.06>	<0.02>		<0.02>
	(3.30)		(4.12)	(1.08)		(0.91)
CHILD	0.32**	0.35**	0.31**	-0.07	-0.06	-0.07
	(3.47)	(3.90)	(3.43)	(-0.73)	(-0.65)	(-0.73)
DIV	-0.34*	-0.35*	-0.34*	0.07	0.06	0.07
	(-2.14)	(-2.21)	(-2.13)	(0.38)	(0.33)	(0.38)
MARRI	-0.11	-0.10	-0.11	0.23*	0.24*	0.23*
	(-1.38)	(-1.21)	(-1.39)	(2.07)	(2.15)	(2.08)
EQUAL	0.18**	0.18**	0.18**	0.28**	0.29**	0.28**
	(3.32)	(3.46)	(3.36)	(3.95)	(3.97)	(3.94)
AGE	-0.01**	-0.01**	-0.01**	-0.01**	-0.01**	-0.01**
	(-9.46)	(-9.29)	(-9.36)	(-6.64)	(-6.61)	(-6.77)
INCOM	0.02**	0.02**	0.02**	0.02**	0.02**	0.02**
	(3.55)	(3.54)	(3.60)	(2.48)	(2.46)	(2.45)
BANKPT	-0.16**	-0.16**	-0.16**	-0.16**	-0.18*	-0.16*
	(-2.54)	(-2.59)	(-2.53)	(-2.54)	(-2.22)	(-2.34)
MALE	0.18**	0.18**	0.18**	-0.01	-0.01	-0.01
	(3.54)	(3.57)	(3.52)	(-0.19)	(-0.23)	(-0.15)
UNIV	0.03	0.02	0.03	0.02	0.02	0.02
	(0.43)	(0.33)	(0.44)	(0.32)	(0.31)	(0.35)
Area[a]	YES	YES	YES	YES	YES	YES
City size[a]	YES	YES	YES	YES	YES	YES
Pseudo R- square	0.03	0.03	0.03	0.03	0.03	0.03
Sample size	1920	1920	1920	1159	1159	1159

Notes: Numbers in parentheses are z-statistics obtained by robust standard error. Numbers in angle bracket are marginal effects calculated at the highest category. * and ** indicate significance at 5 and 1 percent levels, respectively (one-sided tests). *Longer* denotes long-time residents that are defined as those who have been resident at their current address for more than 20 years. * and ** indicate significance at 5 and 1 percent levels, respectively. a, YES means that dummy variables are included to control for area specific or city size specific effects.