Social Capital and Disaster Recovery: Evidence from Sichuan Earthquake in 2008

Chun Wing Tse, Jianwen Wei, and Yihan Wang

Abstract

Social capital can help reduce adverse shocks by facilitating access to transfers and remittances. This study examines how various measures of social capital are associated with disaster recovery after the 2008 Sichuan earthquake. We find that households having a larger Spring Festival network in 2008 do better in housing reconstruction. A larger network significantly increases the amount of government aid received for housing reconstruction. Furthermore, households having larger networks receive monetary and material support from more people, which also explains the positive impacts on recovery from the earthquake.

As for other measures of social capital, connections with government officials and communist party membership do not significantly contribute to disaster recovery. Human capital, measured by the years of schooling of household head, is not positively correlated with housing reconstruction.

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1 Introduction

As literature on environmental shocks acknowledged, poor households in less developed economies are especially hard hit by natural disasters (Jodha and Mascarenhas, 1989; Chen, 1991; Cynthia, 2002). Urban households can rely on insurance market or other formal institutions to cope with the disaster damage (Sawada 2012), but rural households are much more vulnerable and may suffer a prolonged recovery given that institutions are less established and the insurance market is under-developed (UNFCCC, 2009). Economic literature has yet to provide more knowledge on the institutions and coping strategies, which rural households rely on for disaster recovery. This is essential for governments to draw effective disaster relief and rehabilitation policies for rural households.

Existing literature has increasingly studied the role of social capital for poor households in developing countries to cope with adverse shocks (Rodrik, 1998 & 1999). Sociologists emphasize the importance of social capital in agricultural society, in which households use reciprocal help and mutual assistance to overcome economic instability (Berry 1989, Little 1992a). They have shown how gender-based associations (Clark 1994; Goheen 1996), kinship groups (Stone et al. 1995), and age-based organizations (Little 1992b) are assets that allow farmers to weather periods of climatic and economic turbulence. Social capital proves to be the strongest and most robust predictor of population recovery after the Kobe earthquake in Japan (Aldrich 2010).

Economists primarily focus on the role of physical and human capital, yet the economic literature proving the role of social capital for reduction of disaster risk and recovery from disaster shock is lacking (Cassar et al. 2011). Marcel Fafchamps is amongst those economists that have contributed to understanding how social bonds play a role in economic outcomes (Fafchamps and Minten 1999; Fafchamps 2000). For example, Fafchamps (1992) studies the mutual insurance character of solidarity networks. This type of transaction has been coined "generalized reciprocity" (Sahlins 1965). Rosenzweig (1988), Grimard (1997) and Carter et al. (2003) provide important insights on the role of social capital serving for the reduction of exposure to disaster risk. For the literature on post-disaster recovery, Nakagawa (2004), Carter

(2005) and Mogues (2006) are some initial attempts. Adger et al. (2005) and Munansighe (2007) illustrate some ideas for future research.

Given the importance of social capital, we still lack a standard objective measure. Literature uses diverse approaches to describe and measure social capital. The measures used include the size of social network established by the households (Hill et. al 2003) and the characteristics of the network members (McCarty 2002). The size of social network can have paramount importance for disaster recovery. A larger social network allows households to get access to disaster updates and information of government assistance program. Network members can help households apply for and obtain disaster aid. Also, a larger social network can provide more support to disaster victims, such as monetary and material help, as well as counseling assistance, which speeds up the recovery of socio-economic well-being. The characteristics of network members is also an important factor of disaster recovery. Having close connections with the "right" people, such as government officials, can facilitate access to government resources.

This paper investigates how social capital is related to recovery from natural disasters in rural areas and, specifically, we study the housing reconstruction of households in rural Sichuan of China after the earthquake in 2008. Our study uses three different measures of social capital: (1) Size of Spring Festival network, defined as the number of people whom household interacts with during Spring Festival in 2008[1]; (2) Number of government officials whom the households have close connections with; and (3) Communist party membership of household head. We first estimate the effects of various measures of social capital on housing reconstruction. In the second part of the analysis, we explore the channels through which social capital operates.

Spring Festival network and party membership are established before the earthquake. Also, connections with government officials are mostly formed before the earthquake. Hence, ordinary least squares (OLS) estimation should not be subject to reverse causality. The most likely source of endogeneity is omitted variable bias and we resolve this by adding controls, which include the socio-economic characteristics of the household and degrees of earthquake

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[1]Spring Festival marks the beginning of Chinese calendar and in 2008, the Spring Festival starts on February 7, 2008, which is before the occurrence of Sichuan earthquake.

damage. Our findings show that the size of Spring Festival network, has a significantly positive effect on housing reconstruction. But connections with government officials do not have any significant impact. Communist party membership is also not correlated with housing reconstruction. As for the effects of human capital and physical capital, years of schooling of household head does not have any significant impact, but the size of household asset, proxied by the size of farmland, is positively associated with housing reconstruction.

In the second part, we explore the channels through which social capital operates to contribute to housing reconstruction. The results show that a larger Spring Festival network significantly increases the probability of receiving government aid for building permanent housing. The amount of aid obtained is also higher for households with a larger Spring Festival network. Furthermore, a larger network provides significantly more monetary and material support, which explains the positive effect of network size on housing reconstruction. However, we do not find similar effects for connections with government officials and communist party membership. Physical capital and human capital also do not have any impact on the above channels.

Our paper attempts to extend our understanding on the role of social capital for disaster recovery of rural households. Also, existing literature has yet to develop a unified concept and measure of social capital and we explore various dimensions of social capital and compare the econometric results of different measures. Finally, the paper is among a few studies to examine the role of social capital in Chinese society. The role of social network is paramount in China and the country is described as a network economy (Hamilton 1989).

The paper is organized as follows. Section 2 cites some Chinese studies to describe the measure of social capital in the Chinese context, and explain the use of different measures of social capital in our study. Section 3 gives a brief background of Sichuan earthquake in 2008. Section 4 focuses on the data and descriptive statistics and Section 5 discusses the empirical strategy. Section 6 provides the results and Section 7 concludes.

2   Social Capital in China

Chinese sociologists and anthropologists have investigated different measures of social capital to study the importance of social capital for economic development. Bian (1997) is the first sociologist, using Spring Festival network to measure social capital of Chinese households. Spring Festival marks the beginning of the Chinese calendar, usually starting in the second half of January or the first half of February, when relatives, friends and acquaintances interact with each other. The Spring Festival can be regarded as the most important time for reunions and interactions. People having migrated to different parts of China go back to their hometowns to prepare for Spring Festival. Families visit each other and exchange of gifts occur at that time, which has paramount importance for maintaining and expanding social network. The significance of Spring Festival is similar to that of Christmas and New Year in Western society. In a similar token, some studies consider the interactions during Christmas and New Year to measure social capital in the context of Western society. (Lin et al. 2001). Given the significance of the Spring Festival, the size of Spring Festival network, measured by the number of people whom the households interact with, can proxy for the amount of social capital which the household possesses. Such measure is now commonly adopted in Chinese sociological studies (Zhao 2003, Bian et al. 2001a and 2001b, Luo 2008). Another important measure of social capital is connections with government officials, which enables households to have better access to information and public resources. Finally, China is a communist state, and less than 7% of rural residents are members of communist party. Affiliation with the communist party may be beneficial for rural households to obtain special privileges. Our study uses the above three measures to gauge the level of social capital of the sample households.

For existing studies on Sichuan earthquake, Zhao has done a series of sociological research on the role of social capital (Zhao 2007, 2009, 2011 and 2012). Our paper is most relevant to Zhao (2012). He finds that households having a better social network are more capable to obtain funding for housing reconstruction after the Sichuan earthquake, but he does not find any correlation between social network and the amount of government aid obtained[2].

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[2]The empirical analysis in his study may suffer from endogeneity as the specification also includes total amount of funding obtained for housing reconstruction as a control variable.

3 Background of Sichuan Earthquake in 2008

The 2008 Sichuan earthquake, also known as Wench earthquake, occurred on May 12, 2008 and it measured at 7.9 magnitude . The location of the earthquake's epicenter is in a rural area of Wench County, Sichuan, which was 80 kilometers west-northwest of Chengdu (World Earthquakes, May 12, 2008). The earthquake caused more than 69,000 deaths, 18,000 people missing and about 4.8 million people were made homeless. Public infrastructure collapsed and provision of utilities was disrupted for an extended period. The economic losses amounted to 845 billion RMB (122 billion USD). The government declared 10 counties severely destroyed (Jizhongzaiqu) and 29 counties heavily affected (Zhongzaiqu). Figures 1 and 2 show the map of Sichuan province and the casualties caused by the earthquake in different parts of the province.

The earthquake is among one of the deadliest in the Chinese history. Donations came from across the country and the world, which amounted to 50 billion RMB. International rescue teams arrived in the affected areas to provide relief support. (Chinese news website, September 25, 2008) The central government garnered resources across the country for the rescue and rehabilitation efforts. A three-year target was announced, in which all the homeless households should have their houses rebuilt within three years following the earthquake. To finance the housing reconstruction, the government granted each household 20000 RMB (2877 USD in 2008), whose house was destroyed during the earthquake, and the amount may vary depending on the size of the household. Homeless households could also apply for loans from financial institutions and about 20000 RMB would be disbursed on average. The rest of the construction cost would be self-financed by the household. The above subsidy and loan policies were directed by the central government, but the implementation details were subject to the discretion of the county governments and village committees.

4 Data and Descriptive Statistics

Survey teams commissioned by Tsinghua University were dispatched in 2009 to conduct interviews in 17 villages, which were classified by the government as most heavily damaged

(Jizhongzaiqu). Since after the earthquake, transportation was heavily affected and the survey team could only select the villages which could be accessible by cars. The survey was conducted between January and July in 2009, with most of the households interviewed in July. Before the interview, a full list of households in each village was compiled and about 30 households were randomly selected, with 558 households in the full sample. The interview was conducted in Chinese and the respondent can be any member of the selected household, who may not be the head of the household. Information on degree of earthquake damage, amount of aid received, a variety of post-earthquake assistance, and household socio-economic status were recorded in the dataset.

Table 1 presents the descriptive statistics. About 80% of households report that their houses are destroyed or heavily damaged, which are no longer habitable. Among all the respondent households, 528 of them say they needed to rebuild houses. The proportion is about 95% of the overall sample. Note that some households have their original houses still habitable, but claim that they need to build a new house (14% of the total sample). Meanwhile, some households have their houses inhabitable but report that they do not need to rebuild a new house (2% of the total sample). For the 528 households who report their houses no longer habitable, about 48% of them have permanent houses rebuilt by the time of interview in 2009. More than 86% of the full sample receive subsidy for building permanent housing and the average amount granted is about 20,000 RMB (2940 USD). Yet note that some households who need to rebuild houses do not receive any support from the government.

For the measures of social capital, only 8.2% of household heads belong to the communist party. Also, a household has close tie with 2.8 government officials on average. The average size of Spring Festival network is 23.4. Given that the size of a household is 3.2, and about 85% of the household members are adults, each household interacts with 8.6 other households in the 2008 Spring Festival.

Households have 2.5 hectares of farmland and about 15% of households own orchards. About 5% of our sample households are classified by government as impoverished, and 6% are under the protection of wubao/dibao, a form of income protection. Most households have only 6 years of schooling, having finished elementary education.

Table 2 presents the correlation coefficients between various measures of social capital. Size of the Spring Festival network is not strongly correlated with communist party membership or connections with government officials. Connections with government officials are positively correlated with household head being communist party member, but the correlation coefficient is only 0.103.

To compare households who have their houses reconstructed with those who have not, we conduct a simple t-test as shown in Table 3. The size of Spring Festival network differs significantly. Households, who managed to reconstruct houses, have a larger Spring Festival network. However, households who have successfully rebuilt houses, have ties with fewer government officials and their heads are less likely to be communist party members, but the difference is just marginally significant. One possible explanation is that households having connections with more government officials may live in a better quality house to begin with and hence less likely to suffer from earthquake damage. This may also explain the negative correlation between housing reconstruction and communist party membership. Housing subsidy makes a big difference, which is significantly higher among those who successfully reconstruct houses. Also, knowledge of the government housing subsidy program is also positively correlated with housing reconstruction.

Note that, degree of housing damage is positively associated with housing reconstruction. There are two possible explanations: (1) Households whose houses are no longer habitable after the earthquake, have a strong need to rebuild houses as quickly as possible, which may drive them to speed up the housing reconstruction. (2) Households, whose houses are heavily damaged during the earthquake, can be poor quality. After the earthquake, they may again reconstruct another house of low quality, which only needs a shorter time to build.

Table 3 also tells us that human capital, measured by the years of schooling of household head, is not correlated with housing reconstruction. Another measure of human capital is possession of technical license, e.g. licenses for chef, plumber and electrician, and it does not show any significant correlation. Households who managed to reconstruct houses, have a larger farmland, which suggests the importance of household wealth for reconstructing houses.

5   Empirical Strategy

We use simple OLS model in all of our specifications and the primary dependent variable is a housing reconstruction dummy. Specifically, to construct the variable, we only retain the households, who report the need to rebuild houses after the earthquake. After refining our sample, we assign a value of 1 if a household has a house reconstructed by the time of interview, or 0 otherwise.

The dependent variable is a 0 or 1 dummy, which warrants the logit/probit estimation. However, we use the OLS model instead. In three of the sample villages, none of the households interviewed managed to reconstruct a new house. Logit/probit estimation will eliminate all the sample households in those three villages from the estimation after controlling for village fixed effect, which can result in substantial sample loss. Therefore, we report the results of OLS model.

The most important explanatory variables of our interest are various measures of social capital, which are (1) Size of the Spring Festival network, which measures the number of people whom households interacted with during the Spring Festival in 2008; (2) Number of government officials, whom the households have close connections with; and (3) A communist party membership dummy, which takes on a value of 1 if the household head is a member of the communist party.

In our study, the measures of Spring Festival network in 2008 and status of communist party membership of household head are established before the earthquake. Also, not all but most of the ties with the government officials are formed before the earthquake. Given that the interview took place after the earthquake, our data can be subject to recall error. Yet it is reasonable to believe the recall error should be random, which will only attenuate the significance of the estimated effects.

The regression estimates the impact of pre-earthquake social capital on post-earthquake recovery, and the effect should not be subject to reverse causality. The primary source of endogeneity is bias caused by omitting variables, such as household wealth and socio-economic status, which determine both household social capital and housing reconstruction. To address this issue, we control for a list of variables as a proxy of household wealth and socio-economic

status. The control variables can be broadly classified into three categories: (1) Human capital, measured by years of schooling of household head and number of household members possessing technical licenses, e.g. licenses for chef, plumber or electrician etc.; (2) Household wealth, estimated by size of farmland and orchard ownership; (3) Socio-economic status, a dummy which takes on a value of 1 if household is impoverished as classified by the government. Another measure of socio-economic status is a dummy of safety net protection (wubao/dibao), which is assigned a value of 1 if the household is under the protection of safety net. Furthermore, we include also some other control variables, such as the size of household, gender, age, age-squared, marital status of household head and hukou (residential registration). All these variables measure the pre-earthquake status of the households, in which the effects should be less subject to endogeneity. The survey also asks the households about the degree of housing damage and any incidence of mortality, which allows us to estimate the effect of disaster damage on housing reconstruction. Finally, we include the village fixed effect to account for any village unobserved characteristics.

The empirical strategy consists of three steps. In step 1, we estimate the effect of social capital on housing reconstruction. In step 2, we use the same set of control variables and examine how social capital affects some plausible channel variables, including (1) the amount of government aid received for housing reconstruction; (2) knowledge on the government aid program; (3) a dummy indicating whether the households have received support to build temporary housing; and (4) number of people providing monetary and material support. In the final step, we re-estimate the effect on housing reconstruction as in step 1, but adding the channel variables in our specification.

Since the application and allocation of housing subsidy and all other disaster recovery programs are all administered at the village level, it is highly plausible that the error term in our specification is subject to arbitrary correlation within village. Controlling for village fixed effect may not fully account for the correlation among the error terms. Clustering errors at the village level do not work well as we only have 17 villages in the samples. Hence, we use block bootstrapping as suggested by Bertrand et al. (2004) to address the issue of small

number of cluster.[3]

6 Results

Table 4 shows the effects on housing reconstruction and column (4) gives the results using the full specification. The size of Spring Festival network has significantly positive impact on housing reconstruction with 5% level of significance in every specification[4]. Increasing the network size by 10 raises the probability of housing reconstruction by 0.014 as shown in column (4). Such positive impact is also observed in logit/probit estimation. On the other hand, connection with government officials does not significantly contribute to housing reconstruction. The communist party membership of household head even lowers the probability. One possible explanation is that households having a strong tie with government officials are more likely to have a better quality house to begin with and hence less likely to suffer from housing damage. Yet the negative significance is marginal at 10% and disappears in the full specification as shown in column (4). Comparing different measures of social capital, the size of social network is the only significant factor contributing to reconstructing houses.

Note that, the results show strong positive correlation between housing damage and recovery. Household whose houses being totally destroyed during the earthquake is 17% more likely to successfully reconstruct houses than those whose houses are heavily damaged. This may suggest that houses destroyed during the earthquake can be low quality, and the households just reconstruct another house of poor quality, which needs a shorter time to rebuild.

Table 4 shows that the role of human capital is limited. Both years of schooling and holding of technical license do not show significant effect on housing reconstruction in any specification.[5] The increase in R-squared is also little upon including the two variables in the regression. On the other hand, household wealth, as proxied by the size of farmland, has

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[3]Clustering reduces standard errors for most variables and turns the estimated effects of social capital from being insignificant to become significant at 5% or 1% level. The results suggest that, once controlling for village fixed effects and other covariates, there exists negative intra-correlation among households in the same village on housing recovery. This may suggest that there exists competition among village households for government resources for housing reconstruction.

[4]The significance of the effects is the same without correcting the standard errors with bootstrapping, except that the significance drops to 10% level with the full specification of the model.

[5]The lack of significant effects may be due to multi-collinearity. We separately estimate the effects of the two variables of human capital and obtain similar results.

positive effects, which shows the positive relationship between household wealth and housing reconstruction. All other factors, including household size, age and gender of household head, and status of being impoverished, do not affect housing reconstruction. The R-squared does not show a substantial difference between the specifications in column (3) and column (4).

We now examine the effects of social capital on various channel variables. Table 5 shows the results on government subsidies. Expanding the network size by 10 can raise the chance of receiving housing subsidy by 0.013. Also, the amount of housing subsidy received increases by 14%. The increase in total government aid is also significant but only marginally as shown in column (3). Spring Festival network primarily affects the housing aid received by the households, but has much smaller impact on other kinds of aid, such as mortality compensation, living assistantship. On the other hand, communist party membership does not significantly contribute to the amount of government aid received. Connection with more government officials also does not show any significant impact. Among all measures of social capital, only network size has significant effect on household receipt of government aid.

The degree of housing damage is positively associated with the probability of receiving housing subsidy. Households whose houses being destroyed during the earthquake receive 120% more subsidy compared with households whose houses are heavily damaged. Mortality due to earthquake does not increase housing aid received, but more aid in total, which is primarily in the form of mortality compensation. Also, note that female-headed households are more disadvantaged in obtaining government aid and are 26% less likely to receive housing aid compared with the male-headed households. Human capital has no significant effect on the government aid received. Households with larger farmlands do not receive less aid, which suggests poor households are not particularly advantaged in obtaining government subsidy.

Table 6 shows the results on self-rated awareness of government housing subsidy program. A larger Spring Festival network does not contribute to better knowledge. On the other hand, communist party membership is significant in increasing the awareness. Yet connection with more government officials does not affect the self-rated awareness. Furthermore, education of household head is not significantly associated with the self-rated knowledge of the program, so is the possession of technical license. Yet the response is self-rated, which is subject to

bias and measurement error. Household with deceased members has higher awareness, which suggests that households suffering mortality may have a greater need of government support, and hence they receive more details about the government relief program, or they spend more efforts to collect the information.

We also consider various forms of help received by the households after the earthquake. In Table 6, the dependent variable of column (2) is a dummy, which takes on a value of 1 if the household receives support for building temporary housing, such as tents, compartment houses. Probability of receiving help in building temporary housing increases by 0.047 if network size expands by 10. Meanwhile, household size is negatively correlated with the support received, which can be due to more abundant labor resources in a bigger sized household and they need less outside help to rebuild temporary housing.

The dependent variable in column (3) counts the number of people whom households receive monetary and material support from after the earthquake. A larger Spring Festival network leads to significantly more help received after the earthquake, which suggests that social network can provide direct monetary and material support to the affected households. The larger the social network, the higher the likelihood some people in the network will show up to offer help after the earthquake. Yet connections with government officials and community party membership does not lead to more help received. Years of schooling is positively associated with the number of people whom the households receive help from.

In our final step, we include the channel variables to re-estimate the impacts on housing recovery as shown in Table 7. For comparison, we also show the results from the specification without the channel variables. Note that the effect of network size drops substantially and the significance is eliminated after including the channel variables. The receipt of government aid is strongly correlated with housing reconstruction. Other channel variables, including help received to build temporary housing, monetary and material support received and knowledge of government subsidy program, are positively correlated with housing reconstruction, but not significantly. Certainly, the effects should not be taken as causal as the specification is now subject to endogeneity. The findings show that social network can help households obtain more housing subsidy, which is crucial for housing reconstruction. Social network can also

offer direct support in the form of money and material for disaster recovery, which can speed up housing reconstruction.

Even after controlling for the receipt of housing aid, the correlation between housing damage and recovery still remains significantly positive. This further support the possibility that houses having been destroyed are substandard quality, households may just reconstruct another low-quality house, which requires a shorter time to rebuild.

We finally conduct a vulnerability analysis, to examine the factors of housing damage and mortality during the earthquake as shown in Table 8. Housing damage is positively associated with social network. One possible explanation is that households with a larger network may have their houses located in a crowded areas, and hence the houses are more likely to collapse during the earthquake. Yet we still need further investigation to explain the positive correlation. On the other hand, household education is negatively correlated with housing damage, which may suggest that more educated household head may build a better quality house to lower the vulnerability to disaster damage, this may partly explain why human capital has no effect on housing reconstruction. For the factors affecting mortality, social capital and human capital have no significant impact. The size of farmland is positively correlated with the death, but the effect is marginally significant. Furthermore, female-headed households are less likely to suffer from mortality.

7 Conclusion

Our study shows that social capital is important for housing reconstruction after the Sichuan earthquake in 2008. Expanding the size of Spring Festival network by 10 in 2008 raises the likelihood of housing reconstruction by 0.014. A larger network channels more housing subsidy to the households, provides support for building temporary housing, as well as offers direct monetary and material transfer after the earthquake, which are crucial for reconstructing houses. Yet the role of network as an information channel of government recovery program is not significant.

The two other measures of social capital, connection with government officials and com-

munist party membership do not show significant impacts on housing reconstruction. Also, our results do not show significant impacts of these two measures on most of the channel variables.

Amount of wealth possessed prior to the earthquake is crucial for reconstructing houses, since households need to self-finance the rest of the rebuilding cost not covered by government subsidy and loan. Furthermore, higher education of household head and possession of technical license do not have significant effect. Being impoverished or under the protection of wubao/dibao is not significantly disadvantaged for housing reconstruction.

Finally, our results show significant positive correlation between housing damage and housing reconstruction, and the significance still remains after controlling for the receipt of government aid. One possible explanation is that houses having been destroyed during the earthquake may be substandard in quality, and the households may just reconstruct another low-quality house, which requires a shorter time to reconstruct.

The research on social capital is still emerging in economic literature and we are still finding a commonly recognized measure of social capital for the empirical study. The measure should be cultural specific and designed according to the context of the study. At this point, Chinese sociologists are still discussing the most appropriate measure of social capital in Chinese rural society. Our study focuses on size of Spring Festival network, communist party membership as well as connection with government officials. Yet more efforts should be devoted to developing an appropriate measure in the context of disaster recovery in rural economies of China.

Social capital substantially facilitates disaster recovery for rural households and plays an even more important role than education. The impact of social network is even more paramount in China, where the workings of society are primarily operated on relationship, "guanxi". Our findings raise an important concern: Among all the disaster-affected households, the isolated groups in rural areas with small social networks are especially vulnerable. They obtain less support from the government and suffer a slower pace of recovery. A proper targeting of government relief and rehabilitation aid should not just focus on the damage suffered by the households, but also their access to social capital.

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Figure 1: Map of Sichuan province

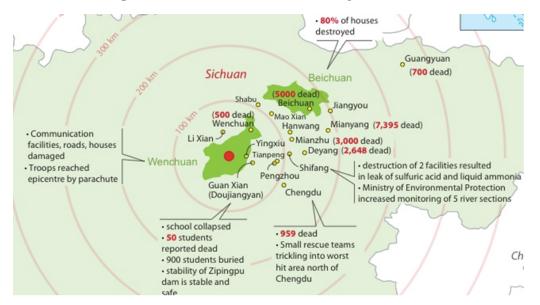Figure 2: Casualties of Sichuan earthquake in 2008

Table 1: Descriptive statistics

Variable	Obs	Mean	Std. Dec.	Min	Max
Spring Festival network	539	23.443	18.654	0	108
Government officials	558	3.057	3.762	0	50
Party: head	558	0.0824	0.275	0	1
Housing reconstruction	528	0.477	0.500	0	1
House subsidy	440	0.866	0.341	0	1
Subsidy amount	439	19640	9620	0	52000
Total government aid	558	24440	14030	0	126800
Knowledge: subsidy	556	2.264	0.695	1	4
Money and in-kind support	557	4.429	6.070	0	70
Temp house rebuilding	558	0.613	0.488	0	1
House damaged	558	0.819	0.385	0	1
Death	558	0.0591	0.236	0	1
Schooling head	552	6.043	3.478	0	14
License holding	558	0.143	0.390	0	2
Household size	558	3.203	1.111	1	7
Impoverished	557	0.0484	0.215	0	1
Wubao/dibao	558	0.0573	0.233	0	1
Female headed	556	0.0486	0.215	0	1
Age: head	557	50.810	12.807	18	90
Farmland	555	2.474	1.402	0	7
Orchard ownership	555	0.169	0.375	0	1

Notes: Data come from responses to the survey (2009). "Housing reconstruction" is a dummy variable indicating whether a proper house has been reconstructed by the time of the interview.

Table 2: Correlation between three different measures of social capital

	Network size	Party: head	Government officials
Spring Festival Network	1		
Party: head	0.048	1	
Government officials	0.065	0.103	1

Notes: "Spring Festival Network" measures the number of people whom households interact with during the Spring Festival in 2008. "Party: head" is a dummy, which takes on a value of 1 if the household head is a Communist Party member. "Government officials" measures the number of government officials whom the households have close connections with.

Table 3: T-tests between households who have reconstructed houses and those not

	(Housing reconstruction = 1) - (Housing reconstruction = 0)	
	(1)	(2)
Spring Festival Network	5.785***	(1.643)
Party: head	-0.0492*	(0.024)
Government officials	-0.438*	(0.17)
Housing subsidy dummy	0.215***	(0.033)
Subsidy amount	7414.3***	(819.5)
Temp house rebuilding	0.014	(0.043)
Total government aid	8980***	(1134)
Knowledge: subsidy	-0.214***	(0.059)
Monetary and in-kind support	-0.441	(0.48)
House damaged	0.142***	(0.031)
Death	-0.0440*	(0.02)
Schooling: head	0.0771	(0.304)
Household size	0.0497	(0.095)
Impoverished	-0.0109	(0.018)
Wubao/dibao	-0.00638	(0.02)
Age: head	-2.607*	(1.118)
License holding	-0.00535	(0.035)
Farmland	0.356**	(0.121)
Orchard ownership	-0.239***	(0.031)

Notes: Columns (1) and (2) report the difference in means and the standard errors respectively. (*** $p<0.01$, **$p<0.05$, * $p<0.1$)

Table 4: Effects on housing reconstruction

	(1)	(2)	(3)	(4)
VARIABLES	House rebuilding	House rebuilding	House rebuilding	House rebuilding
Spring Festival network	0.00175**	0.00182**	0.00157**	0.00137**
	(0.000787)	(0.000765)	(0.000704)	(0.000687)
Government officials	0.00743	0.00718	0.00498	0.00288
	(0.00944)	(0.00986)	(0.00916)	(0.00925)
Party: head	-0.107*	-0.105*	-0.107*	-0.0707
	(0.0559)	(0.0572)	(0.0630)	(0.0602)
Schooling		-0.00110	-0.00101	-0.00753
		(0.00618)	(0.00626)	(0.00695)
Technical license		0.0270	0.0334	0.0421
		(0.0378)	(0.0355)	(0.0362)
Farmland			0.0430**	0.0426**
			(0.0176)	(0.0180)
Orchard ownership			-0.0997*	-0.0858
			(0.0532)	(0.0626)
Household size				-0.0209
				(0.0182)
Impoverished				0.0430
				(0.0917)
Wubao/dibao				-0.0237
				(0.102)
Female headed				0.0450
				(0.139)
2.House damaged	-0.169***	-0.175***	-0.160***	-0.167***
	(0.0597)	(0.0617)	(0.0617)	(0.0615)
3.House slight damaged	-0.321***	-0.320***	-0.311***	-0.298***
	(0.0825)	(0.0829)	(0.0788)	(0.0732)
4.House remain intact	-0.421	-0.414	-0.412	-0.426
	(0.269)	(0.267)	(0.278)	(0.317)
Death	0.0163	0.0218	0.0209	0.0539
	(0.0672)	(0.0658)	(0.0737)	(0.0777)
Constant	0.512***	0.510***	0.429***	0.586*
	(0.0869)	(0.0965)	(0.0911)	(0.301)
Observations	506	500	497	492
R-squared	0.088	0.089	0.103	0.122
Number of village	17	17	17	17

Notes: OLS coefficients reported with robust standard errors in parentheses, bootstrapped at the village level. All regressions include village fixed effect. "House rebuilding" is a dummy indicating whether a proper house has been rebuilt. For house damage, the base group is the households whose houses are totally destroyed. (*** $p<0.01$, **$p<0.05$, * $p<0.1$)

Table 5: Effects on government aid received

VARIABLES	(1) Housing subsidy	(2) Subsidy amount	(3) Total aid
Spring Festival network	0.00133**	0.0140**	0.00266*
	(0.000646)	(0.00647)	(0.00140)
Government officials	-0.00795	-0.0781	0.0295
	(0.00547)	(0.0556)	(0.0260)
Party: head	0.0482	0.290	0.0418
	(0.0584)	(0.560)	(0.0997)
Schooling	0.00198	0.0179	0.00411
	(0.00330)	(0.0352)	(0.00915)
Technical license	0.0334	0.401	0.0560
	(0.0420)	(0.410)	(0.0735)
Farmland	0.000274	-0.00737	0.00874
	(0.00877)	(0.0866)	(0.0249)
Orchard ownership	-0.0389	-0.327	-0.115
	(0.0575)	(0.554)	(0.103)
Household size	-0.0275	-0.263	-0.00725
	(0.0209)	(0.206)	(0.0775)
Impoverished	0.0203	0.0505	0.0576
	(0.0950)	(0.864)	(0.159)
Wubao/dibao	-0.0121	-0.0242	-0.0347
	(0.0995)	(0.899)	(0.173)
Female headed	-0.264**	-2.686**	-0.456*
	(0.125)	(1.231)	(0.260)
2.House damaged	-0.125**	-1.196**	-0.114
	(0.0512)	(0.525)	(0.104)
3.House slight damaged	-0.175***	-1.691***	-0.279**
	(0.0572)	(0.566)	(0.125)
4.House remain intact	-0.156	-1.429	0.174
	(0.182)	(1.864)	(0.438)
Death	0.0180	0.121	0.501***
	(0.0475)	(0.505)	(0.131)
Constant	1.211***	11.88***	10.21***
	(0.295)	(2.944)	(0.527)
Observations	492	492	492
R-squared	0.094	0.090	0.123
Number of village	17	17	17

Notes: OLS coefficients reported with robust standard errors in parentheses, bootstrapped at the village level. All regressions include village fixed effect. "House subsidy" is a dummy indicating whether the household has received housing subsidy. "Subsidy amount" is the logged value of housing subsidy received. "Total aid" is the total amount of disaster aid received. (*** $p<0.01$, **$p<0.05$, * $p<0.1$)

Table 6: Effects on self-rated awareness of government aid program and other types of help obtained after earthquake

	(1)	(2)	(3)
VARIABLES	Knowledge: subsidy	Help: temp house	Money and in-kind help
Spring Festival network	0.00215	0.00471***	0.0522***
	(0.00134)	(0.00108)	(0.0185)
Government officials	0.0130	-0.000473	0.193
	(0.0141)	(0.0119)	(0.187)
Party: head	0.281***	0.0543	0.442
	(0.0873)	(0.0732)	(1.143)
Schooling	0.00698	0.00591	0.212***
	(0.00978)	(0.00654)	(0.0539)
Technical license	0.0856	0.0109	0.413
	(0.0907)	(0.0605)	(0.802)
Farmland	-0.0133	-0.0219	-0.109
	(0.0289)	(0.0207)	(0.190)
Orchard ownership	0.120	0.0530	0.802
	(0.165)	(0.0962)	(1.124)
Household size	0.000675	-0.0386**	-0.191
	(0.0331)	(0.0183)	(0.249)
Impoverished	-0.0730	0.0435	-0.122
	(0.175)	(0.169)	(1.570)
Wubao/dibao	-0.0852	0.178*	1.322
	(0.148)	(0.0969)	(1.298)
Female headed	-0.00533	0.0664	2.419
	(0.178)	(0.122)	(1.565)
2.House damaged	-0.0347	0.0953*	-0.116
	(0.104)	(0.0506)	(0.540)
3.House slight damaged	-0.114	-0.00875	-0.999**
	(0.112)	(0.0617)	(0.446)
4.House remain intact	-0.213	-0.0303	-2.869***
	(0.224)	(0.195)	(0.782)
Death	0.267**	0.00571	1.561
	(0.122)	(0.135)	(2.166)
Constant	1.766***	0.440	3.614
	(0.560)	(0.277)	(4.257)
Observations	490	492	491
R-squared	0.076	0.079	0.102
Number of village	17	17	17

Notes: OLS coefficients reported with robust standard errors in parentheses, bootstrapped at the village level. All regressions include village fixed effect. "Knowledge: subsidy" variable is an ordinal variable recording the self-rated awareness of housing subsidy. A lower value represents a higher awareness. "Help: temp house" is a dummy which takes on the value of 1 if the household receives help in building temporary housing. "Money and in-kind help" is a variable counting the number of people offering monetary and material help after the earthquake. (*** p<0.01, **p<0.05, * p<0.1)

Table 7: Effects on housing recovery with channel variables included

VARIABLES	(1) House rebuilding	(2) House rebuilding	(3) House rebuilding
Help: temp house		0.00386	0.00167
		(0.0312)	(0.0324)
Monetary and in-kind help		0.00486	0.00349
		(0.00300)	(0.00243)
Knowledge: subsidy		-0.00699	
		(0.0232)	
Subsidy amount			0.0278***
			(0.00495)
Spring Festival network	0.00137**	0.00107	0.000784
	(0.000687)	(0.000792)	(0.000792)
Government officials	0.00288	0.00243	0.00437
	(0.00925)	(0.00963)	(0.00964)
Party: head	-0.0707	-0.0714	-0.0804
	(0.0602)	(0.0636)	(0.0647)
Schooling: head	-0.00753	-0.00891	-0.00875
	(0.00695)	(0.00718)	(0.00641)
Farmland	0.0426**	0.0423**	0.0432**
	(0.0180)	(0.0181)	(0.0174)
2.House damaged	-0.167***	-0.168***	-0.133**
	(0.0615)	(0.0628)	(0.0594)
3.House slightly damaged	-0.298***	-0.293***	-0.248***
	(0.0732)	(0.0743)	(0.0738)
4.House remains intact	-0.426	-0.408	-0.376
	(0.317)	(0.321)	(0.346)
Death	0.0539	0.0450	0.0449
	(0.0777)	(0.0769)	(0.0720)
Constant	0.586*	0.581	0.242
	(0.301)	(0.361)	(0.304)
Observations	492	489	491
R-squared	0.122	0.126	0.165
Number of village	17	17	17

Notes: OLS coefficients reported with robust standard errors in parentheses, bootstrapped at the village level. All regressions include village fixed effect. Column (1) reports the previous regression results, without controlling for channel variables, as shown in column (4) of Table (4). "Knowledge: subsidy" variable is an ordinal variable recording the self-rated awareness of housing subsidy. A lower value represents a higher awareness. Columns (2) and (3) control for channel variables. (*** $p<0.01$, **$p<0.05$, * $p<0.1$)

Table 8: Vulnerability analysis

VARIABLES	(1) Housing damage	(2) Death
Spring Festival network	0.00315**	0.000168
	(0.00154)	(0.000354)
Government officials	0.0165	-0.000260
	(0.0184)	(0.00473)
Party member	0.0887	0.0138
	(0.117)	(0.0521)
Schooling	-0.0226**	0.00277
	(0.0114)	(0.00354)
Technical license	-0.0809	-0.0126
	(0.0691)	(0.0212)
Farmland	0.0154	0.0103*
	(0.0327)	(0.00583)
Orchard ownership	0.0570	0.0566
	(0.0814)	(0.0443)
Household size	-0.0201	-0.0165
	(0.0422)	(0.0133)
Impoverished	-0.200	0.106
	(0.179)	(0.129)
Wubao/dibao	0.366*	-0.0267
	(0.206)	(0.0473)
Female headed	0.189	-0.189**
	(0.137)	(0.0933)
Constant	-1.538***	0.406*
	(0.457)	(0.241)
Observations	520	523
R-squared	0.056	0.138
Number of village	17	17

Notes: OLS coefficients reported with robust standard errors in parentheses, bootstrapped at the village level. "Housing damage" is an ordinal variable measuring the degree of housing damage. A higher value represents greater damage. "Death" is a dummy indicating whether the household suffers from mortality during the earthquake. (*** $p<0.01$, **$p<0.05$, * $p<0.1$)