

# IMPORTANCE OF SELF-HELP AND MUTUAL ASSISTANCE AMONG MIGRANTS DURING NATURAL DISASTERS

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## ABSTRACT

In this study, we examine the factors that influence how migrants cope after a natural disaster. We surveyed two different samples of migrants: Filipinos living in Japan after the 2011 Great East Japan earthquake and tsunami and Filipinos living in New Zealand during the 2010/11 Christchurch earthquakes. We examine their risk perception and capability to manage risk on two levels: self-help and mutual assistance and we hypothesize that if migrants are proactive in information gathering and community involvement, they are more likely to be resilient, to self-help and to assist others. Survey responses were analysed using a multinomial logit model yielding results that show how socioeconomic factors affect migrant capability for self-help and mutual assistance and dependence on public or government assistance. Our results suggest that the migrants with the following characteristics are likely to be resilient: (1) long-staying, educated, and permanently employed; (2) engaged in communities, (3) share/discuss disaster risk-reduction (DRR) information; (4) those who have a lower perception of risks and less conscious of other's needs are less likely to be resilient. On the other hand, testing for vulnerability, we find that the average probability of experiencing some serious damage is higher, for migrants: (1) without social or community involvement, (2) who are only somewhat conscious of the risks and needs of others, and (3) have no or few sources of information.

*Keywords:* social cognitive theory, self-help, self-efficacy, mutual assistance, bayanihan as collective action, 2011 Great East Japan earthquake and tsunami, 2010/2011 Christchurch earthquake, Filipino migrants, coping, multinomial logit.

## 1 INTRODUCTION

Japan and New Zealand have two similarities. First, both countries are vulnerable to natural hazards due to their geographical location in the Pacific Rim of Fire. Second, in recent years, both countries have seen a steady growth in the number of foreign nationals with permanent-residency status. As a response to the labour shortage in Japan, the government has begun a quiet revolution of opening its labour market to foreign workers. As of the end of 2018, the number of foreign residents who are legally staying in Japan had reached a historical record high of 2.73 million, roughly 2.1% of total population and an increase of approximately 20% in the past three years [1]. The Ministry of Justice reports that this represents an increase of 6.6% at the end of 2018 from a year earlier, while number of those who overstayed their visas increased to 74,167 up by 11.5% as of 1 January 2019 [2], [3]. On the other hand, New Zealand's estimated resident population as of end of December 2018 was 4,882,500. Available statistics on the number of overseas-born people living in New Zealand (based on the census of 2013) was 1,001,787, a sizeable portion of the country's total population [4], [5].

Japan's national government's willingness to tap foreign labour pool has not been matched by ample provision of services for foreigners in several cities. In a poll taken by Nikkei Research in November and December 2018 among 334 localities, approximately 60% lack support offices to help foreign residents adjust to life in Japan [6] due to "limited administrative resources in terms of personnel and costs".



As the frequency of extreme weather events increase annually, many have voiced concern about reviewing risk management practices particularly in localities with growing number of migrants. According to the United Nations, the term *migrant* means “any person who lives temporarily or permanently in a country where he or she was not born, and has acquired some significant social ties to this country” [7]. In a broad sense, “migrant” includes migrant workers, international students as well as immigrants who are regularly and permanently present in a country [8]. Migrants hurdle various cultural barriers by learning how to cope, adjust and behave according to the rules and norms of society. The social vulnerability of migrants calls for more inclusive disaster risk awareness programs designed to enhance capacity building at the community level which are important to enable self-help as well as mutually cooperative activities in crisis situations.

The literature on disaster resilience in Japan and New Zealand has been extensively examined from a social capital perspective. Similar to the current study, Ikeda and Ozanne [9] conducted a pilot survey of Filipino migrants in Tohoku and Kanto areas as well as in Christchurch and noted the importance of social networks and communication skills as prerequisites to having a proactive attitude towards disaster risk management particularly in an environment with considerable cultural and language barriers. Uekusa and Matthewman’s [10] qualitative study highlights this social vulnerability by conducting in-depth interviews with immigrants and refugees in Canterbury and Tohoku confirm some of the findings in Ikeda and Ozanne [9] about the importance of social capital in resilience; those who actively interacted with others were able to procure supplies not only for their own families but also for others in need.

Based on a survey sample from Tohoku after the earthquake, Sawada and Kuroishi [11] find that damage caused by a disaster tend to have present bias on behaviour which in turn coincides with a high level of trusting people within the same community. This present bias is closely related to social capital as formal and informal bonding within each community as a form of risk-coping behaviour to deal with adverse disaster effects. Aldrich [12] on the other hand points out that social capital proved to be a more significant factor for recovery than physical damage or economic conditions in the aftermath of the 1995 Kobe earthquake. Aldrich observes that cohesive communities are competent at leveraging resources and their bonding which provide needed support in dire situations works like a form of *de facto* insurance. Because of these social capital benefits, individuals are more likely to be empowered and thus less likely to leave a devastated community. In a study about disaster reconstruction in Japan, Aota [13] reviews the government’s concept of the so-called “new public commons” as the foundation of Japan’s disaster risk-reduction (DRR) strategy with the following three main components: a) self-help, b) mutual assistance and c) support from the government or public-private partnerships. Social responsibility and mutual assistance are the tenets of Japan’s resilience in an era of uncertainty and disruption. Mutual assistance dynamics run on social capital that emanates from trust, norms of reciprocity and networks. Harada [14] summarizes well how resilience under the new public commons in Japan is implemented: each person autonomously makes decisions about personal safety which involves preparing oneself on a regular basis in order to be able to cope in a potentially worst disaster scenario where he or she will be on their own with no one else to depend on. For mutual assistance, “formation and maintenance of tight networks based on regular information sharing and collaborative relationships” [14] is crucial. The government provides last-resort support and reassurance for the public.

In this paper, we clarify important factors affecting how migrants particularly those who are living in vulnerable environments (other than their places of birth) exhibit DRR behaviour. We formulate a model based on social cognitive theory and provide empirical evidence using



a sample of Filipinos in Japan and New Zealand circa the 2011 natural disasters. We analyse the vulnerability of migrants and their capability to engage in self-help and mutual assistance initiatives to cope with disaster risks, help others and build resilience in their own communities. We ask which migrant characteristics are related to higher vulnerability to disaster risks and whether migrants self-help and/or help others in a disaster.

## 2 CONCEPTUAL FRAMEWORK: SOCIAL COGNITIVE MODEL FOR MIGRANT DISASTER RISK REDUCTION (DRR) BEHAVIOUR

This section provides a conceptual analysis of the different factors and processes through which migrant capability to self-help and assist others affect DRR behaviour. A social cognitive model is conceptualized to analyse the factors affecting how migrants conduct self-help and engage in mutual assistance strategies to disaster resilience.

### 2.1 Vulnerability and resilience

Combaz [15] defines “disaster resilience as the ability of individuals, communities to adapt to and recover from hazards, shocks or stresses without compromising long-term prospects for development.” Disaster resilience and vulnerability are intrinsically related in a complex and multidimensional manner. While reducing risk behaviour can potentially enhance resilience, it is misleading to conflate less vulnerability with increased resilience. In our conceptual framework based on social cognitive theory, we depict vulnerability and resilience to be affected by what Bandura calls “triadic reciprocity” [16] of personal experiences, behaviour and the environment. However, vulnerability is represented not as a mirror image or binary opposite of resilience (Fig. 1). The literature cites various forms of resilience (natural or physical, adaptive, restored, etc.), so migrants can be resilient in some but not other aspects due to differences in personal characteristics, competencies, knowledge, experiences, practices or how they interact with and learn from their environment.

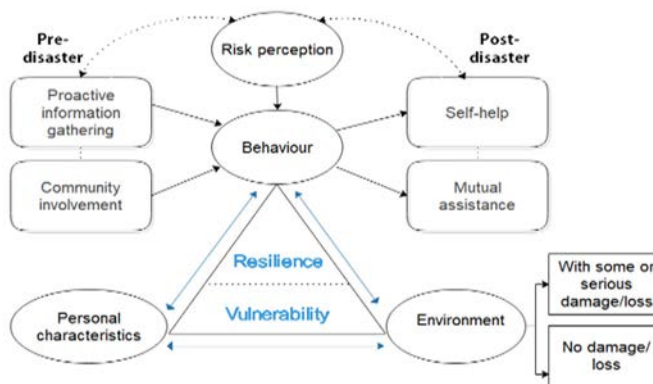


Figure 1: Migrant disaster resilience and social cognitive theory.

### 2.2 Factors affecting self-help, mutual assistance and disaster risk reduction

To understand the factors of self-help and mutual assistance, we studied the concepts of self-efficacy and collective efficacy in social cognitive theory. Bandura explains that the key lies in the “belief in one’s own or group’s capability to organize and execute the courses of

action to manage often stressful situations and that such beliefs influence how people think, feel, motivate themselves and act". These beliefs influence choice sets and capability to execute a behaviour successfully. Bandura proposes the concept of triadic reciprocity and defines human behaviour as a dynamic, and reciprocal interaction of a) personal factors, b) behaviour, and c) environment. Individuals operate cognitively on their social experiences and these cognitions then influence behaviour [16].

Paton applies social cognition concepts to disaster preparedness such that an individual's risk perception and hazard anxiety is affected by the level of social consciousness or how much people are consciously thinking and discussing about disaster risks in undisrupted periods of quiescence which motivate individuals towards protective or mitigation action [17]. Paton calls this motivation phase as pre-cursor variables linking intentions and belief in one's capability to prevent adverse outcomes through preparation. In our conceptual framework shown in Fig. 1, we adapt Paton's view about *pre-disaster* variables and indicate factors such as proactive information gathering, community involvement and risk perception, and personal characteristics which affect beliefs on his or her ability to mitigate hazards through self-help and/or collective initiatives.

According to a recent study by Babicky and Seebauer [18], collective efficacy or a group's shared belief in its joint capabilities to achieve an objective, influences risk perception, anxiety, and self-efficacy towards protective action. These studies [17], [18] indicate a complex interrelatedness between the beliefs that buttress self-efficacy and collective efficacy.

In this study, we consider personal characteristics, risk perception, information sources, community involvement and behavioural attitudes before and after a disaster: (1) personal characteristics: age, residency/visa status, gender, marital status, number of years staying in the country (Japan or New Zealand), number of years staying in the immediate disaster area; (2) community involvement: in any community group (Filipino, local, neighbourhood or professional associations, etc.); (3) behaviour: pre-disaster (proactive self-initiated DRR information gathering, drills and community involvement) and post-disaster (share/discuss DRR and recovery information, help others, volunteer in drills and/or recovery activities, receive information from others; utilise government sources of information and accept assistance from others); (4) risk perception: whether one is always/sometimes/never conscious of disaster risks and the needs of others; (5) information: sources of DRR information (family, friends, neighbours, TV, radio, news, social media, government; (6) environment: severity of disaster outcome experience (no/some/serious damage or loss).

### 2.3 Hypothesis building and model formulation

We hypothesise that migrant engagement in DRR behaviour is affected by factors including *personal characteristics, social capital (prosocial or community involvement, shared information, community coping) as well as the capability to self-help and help others*. Here, we hypothesize proactive or action-oriented self-help akin to our prior description of social cognition that incorporates risk perception and how individuals are conscious of other people's needs. The role of self-help plays a key role in risk reduction and quality of coping in crisis situations.

Collective action is defined as when two or more people coordinate their actions in space and time. Cultural factors may play a role as Filipinos harness community involvement and practice a custom called *bayanihan*. Engagement in their communities not only among Filipinos but also with the local communities is found to enhance their social competence and capability to recover as well as to help others and engage in community recovery [9].



Thus, we expect that community involvement or some form of social capital affects the intention to conduct disaster risk reduction behaviour.

Based on the social cognitive model of migrant disaster resilience in Fig. 1, we formulate the following hypotheses: (1) migrants learn from each other and from their environment; (2) personal characteristics, behaviour, risk perception and environmental factors influence vulnerability and disaster resilience; (3) individuals who are more proactive in DRR information gathering and who are more socially connected are more likely to either engage in self-help or mutually assistance; (4) capabilities to self-help or mutually assist each other affect resilience; (5) self-help and mutual assistance substitute for reliance on government support.

### 3 RESEARCH METHODOLOGY

Based on the literature review and components of social cognition described above, we hypothesized that certain migrant characteristics promote behavioural attitudes that enhance migrant resilience either through self-initiated or mutually cooperative DRR activities.

#### 3.1 Collection of data

Field work and face-to-face interviews in Christchurch, New Zealand, and Sendai, Kessenuma, Ishinomaki and Higashi Matsushima, Japan were conducted in 2015 in order to have an initial understanding of the earthquake experiences of Filipino migrants in these areas. From these interviews, we developed a pilot online survey questionnaire (in English and Filipino) with 40 questions, which we pre-tested in Christchurch in January 2016. However, due to the low response rate and feedback that the questionnaire was too long, we reduced the questions to 18 for the succeeding surveys in Christchurch, Tohoku and Kanto, to enable respondents to complete the survey within 10 minutes. We ran the surveys from January 2016 to March 2017 in New Zealand and Japan.

The survey used a respondent-driven sampling (RDS) method which is a variation of snowball sampling. This particular sampling method is appropriate because it contends that those who are best able to determine members of target populations are their own peers, and therefore allows the researchers (through their initial contacts) to locate people of a specific population (Filipinos affected by the earthquakes). This sampling method, combined with the online survey questionnaire, yield a simple and efficient data collection method.

#### 3.2 Characteristics of respondents

We find that the social connectedness of the Filipino migrants surveyed is relatively strong. About 76% of those surveyed in Japan are involved in some kind of social or community group, and 85% in New Zealand. Further, on average, approximately 70% of those surveyed in Japan and New Zealand participate, discuss and share information about disaster preparedness, 90% indicate that they are conscious of the risks and needs of people during and after disasters, 75% provide material help (money, food, clothing, shelter), and 62% volunteer in their community's earthquake preparedness and recovery activities.

We also find that although the respondents in Japan and New Zealand are generally proactive when it comes to accessing information either through their own initiatives or through family and friends, on average, the New Zealand respondents (on average 79%) were relatively more proactive than the respondents in Japan (on average 59%). It is also interesting to note that 72% of the New Zealand respondents also sought information from government agencies, compared to only 21% of the Japanese respondents.



### 3.3 Description of the variables and logistic regressions

We briefly summarize and describe the variables of the empirical model in Table 1. We ran logistic regressions to *determine whether certain socio-demographic characteristics (education, employment, length of residency in disaster area, social or community group involvement) have any effect on the probability of an individual being resilient during disasters* (Model 1). We also tested *whether certain activities, for example, participation in disaster drills, sharing or discussing disaster-related information, and/or volunteering in disaster preparedness and recovery activities have any effect on the probability of an individual being vulnerable during disasters* (Model 2). Our proxy indicator of resilience is based on whether or not an individual received any assistance or support after the disaster, and vulnerability is based on how severely an individual was affected by the disaster.

Table 1: Description of the variables.

Latent variables	Measurable variables	Description
Personal characteristics	Age	Age
	Residency	Residency/visa status
	Gender	Sexual orientation
	Marital	Marital status
	Dis. years	Number of years living in the disaster area
	Country years	Number of years living in Japan or New Zealand
	Educ.	Educational attainment
	Employ	Employment/job status
Behavioural	Social (pre-disaster)	Community/social involvement
	Drills (pre-disaster)	Participation in DRR drills before 2011 disasters
	Self-help	Self-initiated gathering of DRR related information
	Mutual	Received information from family or friends
	Government	Utilised government-provided information
	Share (post-disaster)	Share or discuss DRR and recovery information
	Donate (post-disaster)	Donate money, food, supplies, clothing, shelter/room
	Volunteer (post-disaster)	Voluntarily participate in DRR and/or recovery activities
Risk perception	Conscious	Conscious of risks and needs of other people
Information	Info	Number of sources of DRR-related information
Environment	No damage/loss	Experienced no post-disaster damage/loss
	Some damage/loss	Experienced some post-disaster damage/loss
	Serious damage/loss	Experienced serious/severe post-disaster damage/loss

Model 1 determines what factors in general affect individuals' resilience to natural disasters, where  $Y_i$  takes the value of 1 if the individual did not receive any assistance or donation, and 0 otherwise. There are two ways to interpret the resilience of individuals with respect to whether or not she received any help. First, an individual who did not receive any help is resilient because she did not require any help during or after the disaster and is able to attend to her own needs. On the other hand, an individual who received help can also be



resilient because this individual knows how to get the help she needs and to harness the aid she received under scarce and dire conditions. For these reasons, we do not have any a priori hypothesis regarding the sign of the coefficients of the explanatory variables for resilience.

We run independent binary logistic regression models in which one outcome is chosen as the “base” outcome and the other outcome is separately regressed against this base outcome. For example, we chose the outcome: did not receive any assistance or donation as the base, and estimated eqn (1) using maximum likelihood:

$$\ln \frac{\Pr(Y_i=1)}{\Pr(Y_i=0)} = \beta \cdot X_i. \quad (1)$$

The regressors ( $X_i$ ) include personal socio-demographic characteristics of the respondent and also variables that measure individual’s behavioural attitudes related to accessing disaster-related information and social networking. We hypothesise that *individuals who are more proactive with respect to information gathering and who are more socially active are characteristics of resilient individuals*. Specifically:

$$X_i = \begin{pmatrix} \text{Country}_i, \text{Age}_i, \text{Residency}_i, \text{Gender}_i, \text{Marital}_i, \text{DisYears}_i, \text{CountryYears}_i, \\ \text{Educ}_i, \text{Employ}_i, \text{Social}_i, \text{Info}_i, \text{Selfhelp}_i, \text{Mutual}_i, \text{Government}_i, \text{Drills}_i, \\ \text{Conscious}_i, \text{Share}_i, \text{Donate}_i, \text{Volunteer}_i \end{pmatrix}. \quad (2)$$

Model 2 determines the factors that affect individuals’ vulnerability to natural disasters. We used multinomial logistic (MNL) models to explore these. Vulnerability is measured in terms of the individuals’ self-reported assessment of how severely they were affected by the crisis, that is, whether or not they experienced damage or injury to themselves and/or their household because of the disaster. For  $K$  possible outcomes:  $K_1$  = no damage/injury;  $K_2$  = some damage/injury; and  $K_3$  = serious damage/injury, we ran  $K-1$  independent binary logistic regression models in which one outcome is chosen as the “base” outcome and the other  $K-1$  outcomes are separately regressed against this base outcome. For example, we chose outcome  $K_1$  (i.e., the individual experienced no damage/injury) as the base, and estimated the following eqns simultaneously using maximum likelihood:

$$\ln \frac{\Pr(Y_i=K_2)}{\Pr(Y_i=K_1)} = \beta_1 \cdot X_i. \quad (3)$$

$$\ln \frac{\Pr(Y_i=K_3)}{\Pr(Y_i=K_1)} = \beta_2 \cdot X_i. \quad (4)$$

Note that for each possible outcome there is an identical set of regressors ( $X_i$ ). The regressors include and factors that capture the extent of individuals’ involvement in their respective communities and how they access information about disasters. Specifically:

$$X_i = \begin{pmatrix} \text{Social}_i, \text{Info}_i, \text{Selfhelp}_i, \text{Mutual}_i, \text{Government}_i, \text{Drills}_i, \\ \text{Conscious}_i, \text{Share}_i, \text{Donate}_i, \text{Volunteer}_i \end{pmatrix}. \quad (5)$$

#### 4 ANALYSIS AND FINDINGS

Table 2 presents average marginal effects of all (significant) explanatory variables on the probability that an individual received some form of help because of the disaster. Marginal effects show the change in probability when one explanatory variable increases by one unit, while keeping all other variables constant. For continuous variables this represents the instantaneous change since the “unit” may be very small. For categorical variables, the marginal effects show the predicted possibilities for a specific category relative to a base or reference category, and for binary variables, the change is from 0 to 1.



Table 2: Logistic regression: Base Outcome: Received assistance/donation.

Log likelihood = -45.352555		LR chi2(38) = 80.90; Prob > chi2 = 0.0001	
Number of observations = 124		Pseudo R2 = 0.4714	
Question/variable	Response	Average marginal effect	Standard error
<i>Country</i>	Japan	0.8097***	0.1450
<i>Residency</i>	Citizen/permanent resident in Japan or NZ		
	Trainee/student visa/permit	0.3677***	0.0796
	Spouse/partner/dependent of citizen/resident	0.2828***	0.0751
<i>Marital status</i>	Married		
	Single	0.1748*	0.0907
	Divorced/separated	0.2321**	0.1149
<i>Years in disaster area</i>	10 years or more		
	4–9 years	-0.3200***	0.0757
	Less than 4 years	-0.4839***	0.0671
<i>Years in Japan/NZ</i>	10 years or more		
	4–9 years	0.3196***	0.0712
<i>Education/qualification</i>	University graduate		
	High school	0.1998**	0.0979
	Vocational or technical training	0.2117*	0.1122
	University postgraduate	-0.2027***	0.1771
<i>Current work</i>	Employed full time		
	Self-employed	0.2458*	0.1408
<i>Sources of information</i>	Many different sources		
	Few sources	-0.1882*	0.0967
	None	-0.3471**	0.1560
<i>Participate in DRR Drills</i>	Always/many times		
	Never	-0.2831**	0.1161
<i>Conscious of risks and others' needs</i>	Always/Often		
	Sometimes	-0.2961***	0.0614
	Never	0.3587***	0.0681
<i>Share or discuss DRR information</i>	Always/many times		
	Sometimes	0.1633*	0.0937
	Never	0.3025***	0.1114
<i>Donate</i>	Always/many times		
	Sometimes	0.3207***	0.0889
<i>Volunteer in community DRR</i>	Always/many times		
	Rarely	-0.2484**	0.1148

Note: \*\*\*, \*\* and \* indicate statistical significance at the 1%, 5% and 10% level, respectively.





An intuitive way of interpreting these average marginal effects that essentially compares the “typical” individual (the reference group) with another individual who differs on one category. The reference group in Model 1 represents a typical individual: who has lived in the disaster area for 10 years or more, a university graduate, employed full-time, is able to access vital disaster information by himself/herself and participates in social, community activities.

Based on our results, the following socio-economic characteristics are statistically significant for individuals who did not receive any assistance or donation: residency, number of years living in the disaster area and in the country, education and work status. We find that Japanese residents are more likely than New Zealanders to have received assistance or donation. Compared to citizens/permanent residents, students, and partners/dependents of citizens/permanent residents are also more likely to have received assistance/donations. We also find that new settlers in the affected regions are less likely to have received any assistance. For new settlers, not receiving any assistance can be an indication of higher vulnerability because they do not know where to go for help that they need in these localities.

We also find that those with post-graduate qualifications are less likely to have received any assistance. We can also think of a postgraduate qualification as a proxy for financial well-being, and so those with postgraduate qualifications would have more financial security to cope with disasters and require less assistance. Relative to those with university qualifications, those with only a high school qualification or vocational/technical training are 20 and 21 percentage points respectively, more likely to have received assistance. Compared to those with a full-time job, those who are self-employed are 24 percentage points more likely to have received assistance.

Of the social-networking variables, we find that those who are less socially aware, e.g. those who are not conscious of other people’s needs and those who do not share or discuss information with others are more likely to receive assistance.

Finally, Table 3 presents average marginal effects of all (significant) explanatory variables on the probability on observing different outcomes related to how an individual has been affected by the disaster (no/some/serious damage or injury).

Our multinomial logistic regressions confirm that various mutual help and social networking variables influence the level of engagement in disaster preparedness and thus lead to reduced vulnerability outcomes (whether she experienced damages and the degree of severity such as (no/some/serious) losses). The base (significant) predictors are: involvement in Filipino/Japanese/New Zealand, other community gatherings; sought/received information from various sources (family, friends, colleagues, news, etc); received information from government sources; active participation in disaster drills; active consciousness of people’s risks and needs; active sharing of information about disasters; frequency of donations made; and active volunteering in disaster preparedness and recovery activities. The measure of self-perceived level of proactive behaviour is operationalized based on questions such as: “How often do you participate in earthquake/tsunami/fire etc drills?”; “How often do you volunteer in community’s earthquake preparedness/recovery activities?”; “Are you conscious of own risks as well as needs of others during and after natural disaster episodes?” to which respondents assess themselves based on levels of frequency (always/many times, sometimes, rarely, never) or degree/intensity (Yes, always/sometimes; No, rarely/never) conscious of risks. We use this measure of self-perceived proactivity as an indicator for self-help as it deals with the subjective assessment that a person makes about one’s perceived capability to make things happen in crisis situations and serves as an independent predictor of resilience.



Table 3: Multinomial logistic regression.

Log likelihood = -82.091531		LR chi2(38) = 105.26; Prob > chi2 = 0.0000					
Number of obs = 148		Pseudo R2 = 0.3907					
Question/variable	Response	No damage		Some damage		Serious damage	
		Average marginal effect	Standard error	Average marginal effect	Standard error	Average marginal effect	Standard error
<i>Social or community involvement</i>	Filipino/Japanese/NZ/Other communities						
	Not involved	-0.212**	0.1027			0.239*	0.124
<i>Source of information</i>	Many sources						
	Few sources	-0.196**	0.0874	0.218**	0.093		
	Received no information	-0.428***	0.1118	0.394**	0.163		
<i>Information from government</i>	Yes						
	No	0.230***	0.0688	-0.202***	0.074		
<i>Participate in DRR drills</i>	Always/many times						
	Sometimes	-0.256***	0.084	0.255***	0.0885		
<i>Conscious of risks and others' needs</i>	Always/many times						
	Sometimes					-0.055*	0.029
	Rarely	-0.029**	0.145			0.325**	0.133
<i>Share or discuss DRR information</i>	Always/many times						
	Rarely			-0.321***	0.093	0.425***	0.076
	Never					-0.073***	0.025
<i>Donate</i>	Always/many times						
	Sometimes					-0.1345**	0.0636
	Rarely					-0.205***	0.045
	Never			0.2362*	0.1217	-0.142***	0.049
<i>Volunteer in community DRR</i>	Always/many times						
	Sometimes	0.344***	0.095	-0.373***	0.095		
	Rarely	0.522***	0.114	-0.510***	0.111		
	Never	0.308***	0.118	-0.223*	0.120	-0.085***	0.305

Note: \*\*\*, \*\* and \* indicate statistical significance at the 1%, 5% and 10% level, respectively.

Consistent with our hypotheses, we find that the average probability of experiencing no damage is lower, and the average probability of experiencing some serious damage is higher, for individuals who have no social or community involvement, those who are only conscious of the risks and needs of others sometimes. For those who have no or few sources of information, the average probability of experiencing some damage is higher, while the average probability of experiencing no damage is lower. We think that the more sources of

information a migrant has access to, the more she is able to validate acquired information that can be utilized to reduce risks.

For effects of mutual assistance, we find evidence that the average probability of experiencing no damage is higher, and for experiencing some and serious damage is lower for those people who always engage in sharing/discussing information about disaster preparedness and recovery; for those who donate in cash or kind to disaster victims; and for those who volunteer in preparedness and recovery activities. Our survey results concur with our interviews that some of the migrants were able to cope with the disaster effects and in the process experience a sense of psychological and social growth.

Our field interviews reveal anecdotal evidence that indicate Filipino migrant communities are self-helping groups. It was the first time they experienced a massive natural disaster and yet when asked why they actively helped others during the relief and recovery period, many replied, “to divert focus away from my own pain or loss”. Many respondents felt the need to be useful in their communities “like many others around them who were just thankful to be alive” and realized a self-affirming change in themselves as a member of the Filipino community by actively helping others after the disaster and by earning recognition not only in their own communities but also in media for their civic-minded efforts.

Finally, for those who did not get information from government sources, the average probability of experiencing no or some damage is also higher. This may have two important implications. First, weak public information dissemination on disaster risks have not reached overseas-born residents due to either government implementation weakness or migrant lack of communication skills particularly among respondents in Japan who have low Japanese language proficiency. Second, social cohesiveness and collective efficacy prove our hypothesis that social connectiveness or community involvement of migrants is vital as migrants learn and empower each other to either self-help or help others.

## 5 CONCLUSION

We studied how migrants in Japan and New Zealand coped during episodes of massive natural disasters in 2010–2011. Using questionnaire survey data collected from Filipino migrants in these countries, we empirically test a model of migrant disaster resilience and vulnerability based on social cognitive theory. Using multinomial logit regression, we find evidence for mutual assistance as a strong determinant of reduced vulnerability among Filipino migrants living in Japan and New Zealand. Our findings suggest that vulnerability to some or serious damage is higher for migrants who are not community involved and only somewhat conscious of disaster risks. We find stronger evidence for community involvement and mutual assistance than for self-help in Filipino migrant DRR behaviour.

In addition, this study provides evidence that public information dissemination on disaster risks have not reached nor appealed to most of the foreign-born residents that responded to our survey. Our findings also show that social cohesiveness enhance mutual cooperation and can effectively reduce migrant vulnerability to natural disasters to the extent that it may substitute for lack of or weak government support. Community involvement of migrants lessens their direct dependence on government support. These findings on the importance of self-help and mutual assistance are considerably relevant in vulnerable places where population of migrants or overseas-born individuals is steadily growing in the face of limited or lack of public resources for migrant support services.

For policy recommendations, to reach those who do not have strong bonds with other migrants nor local communities, government authorities need to implement inclusive information dissemination in mainstream and social media to increase awareness on disaster risks and consequences of ill-preparedness. Finally, tapping non-government organizations



and other civil service organizations that help improve or deepen linkages between migrants and their neighbours or locals, need to be further harnessed at the micro or community-level.

Due to time and data constraints, the analysis of our paper is limited in scope and we encourage others empirical analyse the interrelatedness of self-help and mutual help motivations of locals and foreign-born residents to examine how they adapt to and learn from each other in a vulnerable disaster setting.

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