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Household Coping and Recovery from Nature's Wrath: Rising from the Ruins of Yolanda

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Abstract

Typhoon Yolanda (*Haiyan*), one of the strongest storms ever recorded, hurled massive destruction across the central part of the Philippines in Nov 2013. The question foremost in everybody's mind is whether the Yolanda-affected families have already recovered. Using the PCED Social Protection Survey conducted 6 months after the disaster, we find that 36% of the households have yet to experience even partial recovery. We investigate the various coping mechanisms that the Yolanda-affected families have employed to aid in their recovery using logit-regression analysis. We find that the most prominent coping activity is taking precautionary measures and asset disposal. Government assistance positively aided in the recovery but only of the poor. Further, the probability of recovery is lower for those that are located in the badly-hit Leyte relative to the other provinces.

Keywords: Natural Disaster, shock, coping
JEL Codes: Q54, D81, I38,

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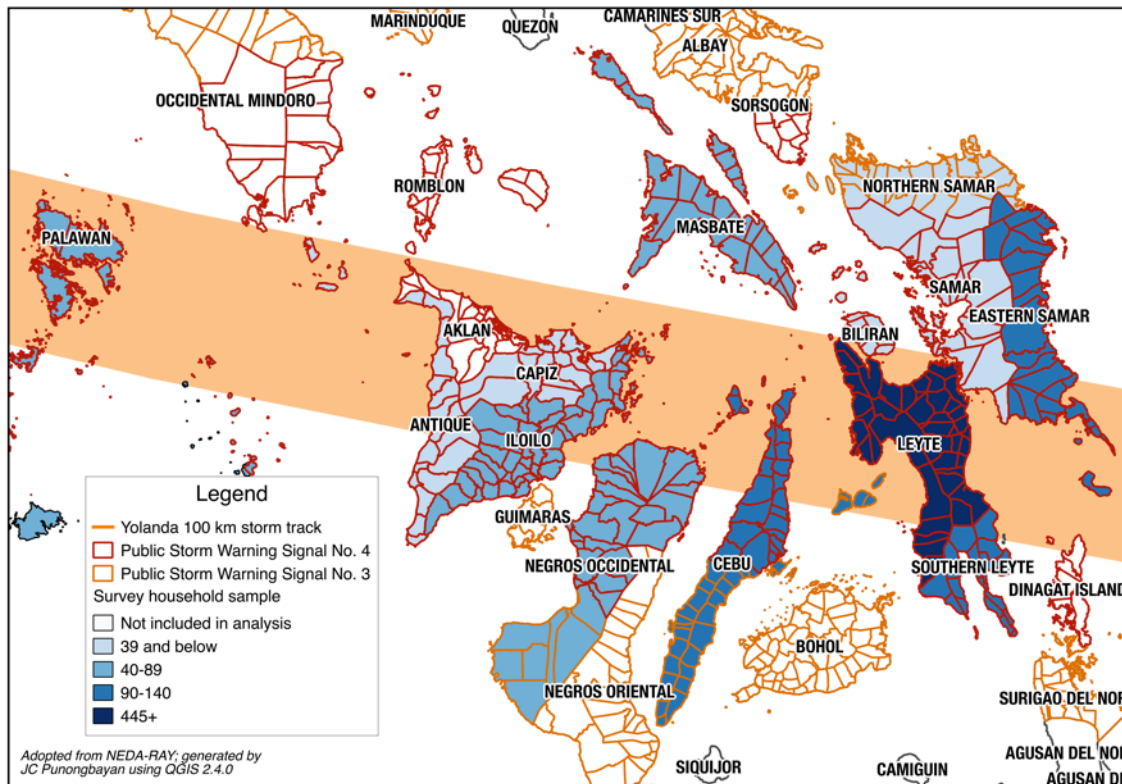
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I. Introduction

On 8 November 2013, Typhoon *Yolanda* (Haiyan) hurled massive destruction across the central part of the Philippines. It triggered a storm surge that reached over four meters, rapidly swallowing the coastal towns of Eastern and Western Samar and Leyte provinces (see Figure 1). *Yolanda* was one of the strongest storms ever recorded in history--with wind speeds of more than 300 kilometers per hour (km/h).

Figure 1. Storm Track of Typhoon Yolanda and distribution of sample by province



The Reconstruction Assistance on Yolanda (RAY) by the National Economic and Development Authority (NEDA) provided the first synthesis of the overall economic impact of Yolanda based on the best available data and information. Official count puts human casualties to 12.2 million people or 2.6 million families; total damage and loss to both public and private across sectors totaled PhP571,108.50 million (NEDA, 2013) or about 4% of GDP.

Six (6) months after the disaster, have the Yolanda-affected families already recovered? Utilizing the first Philippine Center for Economic Development (PCED) Social Protection (SP) Survey, we find that 36% of the household samples still have not yet experienced even partial recovery. We investigate the various coping mechanisms that the families employed in their recovery using logistic-regression analysis. We find that the most prominent coping activity is taking precautionary measures and asset disposal. Government assistance positively aided in recovery of the poor. Further, the probability of recovery is lower for those that are located in the badly hit Leyte relative to other provinces.

To the best of our knowledge, our data is one of the few obtained 6 months after the fateful event. We briefly describe the SP Survey in the next section. Section 3 presents empirical evidence and the last section concludes.

II. Conditions Prior to Yolanda

NEDA RAY 2013 focuses on the six affected regions with highest reported damage and falling within the band of the 100km storm track. This includes the regions of IV-B (MIMAROPA), V (Bicol), VI (Western Visayas), VII (Central Visayas), VIII (Eastern Visayas), and XIII (CARAGA).^a These six regions account for 17.4% of the country's gross domestic product (GDP) in 2012. In terms of sectoral share, the Yolanda-affected regions account for 26.8% of total agricultural output, 16.7% of industry, and 15.8% of services. Region VIII or the Eastern Visayas Region was the hardest hit among the six regions. It accounts for 2.2% of the country's GDP in 2012. In terms of sector share, agriculture contributes the highest at 4%, relative to industry and services at 2.7% and 1.5%, respectively [Philippine Statistics Authority (PSA), Regional Accounts, 2012].

Table 1 presents a disaggregated profile of severely-affected provinces in the abovementioned affected regions. The Yolanda-affected areas are characterized as largely rural, with a total population of about 14.9 million. The average per capita income is PhP43,785, which is 25% lower than the national average. Pre-Yolanda data also show that the poverty incidence in these severely-affected regions were relatively high, with the biggest incidence occurring in Eastern Samar province at 55.4%.

^a The National Disaster Risk Reduction and Management Council (NDRRMC) reported a total of 9 regions and 44 provinces affected by Yolanda (<http://www.gov.ph/2013/11/11/ndrrmc-typhoon-yolanda-report-per-province-november-11-2013/>).

Table 1. Conditions before Typhoon Yolanda

Yolanda-hit Provinces	Population ('000)	Per Capita Income	Per Capita Expenditure	Poverty Incidence (%)
Region VIII	4,101	40,713	32,440	37.4
Leyte	1,789	49,251	38,535	31.4
Southern Leyte	399	45,362	36,440	34.0
Eastern Samar	429	30,147	25,240	55.4
Samar (Western Samar)	733	27,393	22,895	43.5
Northern Samar	589	32,367	23,732	43.5
Biliran	162	42,872	40,578	20.9
Other Provinces	10,897			
Antique	546	45,901	33,628	23.6
Capiz	720	52,039	42,599	22.3
Cebu	3,356	53,101	42,301	18.9
Iloilo	2,230	65,117	48,030	20.8
Masbate	708	31,832	27,011	40.6
Negros Occidental	2,566	46,377	39,694	24.9
Palawan	772	47,440	36,045	20.5
Total	14,998			
Philippines	92,338	58,583	47,752	19.7

Sources: Population is from 2010 Census and Housing Population; average annual income and average annual expenditure (per Capita, 2012) is based on Philippine Statistical Authority-Family Income and Expenditure Survey (PSA- FIES 2012); and poverty incidence is from PSA 2012 Full-term Official Provincial Poverty Statistics. Province of Dinagat Islands under Region XIII is excluded.

III. Data from the PCED Social Protection Survey

Conducted from May to June 2014, the PCED SP Survey is designed to investigate the full spectrum of shocks experienced by Philippine households and to examine how these households cope with shocks. Using a multi-stage cluster sampling design, the SP Survey took a nationally-representative sample of 3100 households who were randomly drawn from 57 out of the 80 provinces of the Philippines. The sample selection was based on high- and low-risk areas to natural events, population density, and security issues. The survey instrument took off from the PhilHealth Prepaid Premium (3P) Study found in Capuno *et al.* (2013).

Based on the severely-affected provinces identified by NEDA RAY (2013), we are only utilizing the household samples in the 13 provinces (Table 1). Moreover, out of the 3,100 national samples, we have a total of 1,065 household samples from the severely-affected provinces as basis of our analysis. The PCED SP Survey has the provinces of Region 8, including Leyte, under its domain. Figure 1 shows the distribution of household samples by province (blue color spectrum), with the province of Leyte having 445 household samples (darkest blue).

To investigate the recovery and coping mechanism of the Yolanda-stricken households, we consider only the sample in the 13 provinces with highest reported damage and falling within the band of the 100 km storm track in NEDA (2013). Out of the 3,100 national samples, we have a total of 1,065 households from the severely affected-provinces as basis of our analysis. The SP Survey has the provinces of Region 8, including Leyte, as one of its domains. Leyte alone has 445 household samples.

In the SP Survey, shock is an unforeseen adverse event that can lead to a decrease in welfare. We define “Yolanda shock” as the four natural events of extreme intensity--strong winds and rain, flood, landslides, and tsunami and storm surge—that were experienced by the households in November 2013. Out of the total 1,065 samples in the identified severely affected area, 797 were affected by Yolanda. Table 2 shows the incidence of Yolanda shock, with 797 having been affected by Yolanda out of the total 1,065 samples in the 13 identified severely-affected provinces.

Table 2. Households Affected by Yolanda (by type of highest ranked shock)		
Shock	Frequency	Percent
Strong winds and rain	683	85.70%
Flood due to continuous rain, storm, etc.	90	11.29%
Landslide/mudslide	3	0.38%
Big Waves (including tsunami and storm surge)	21	2.63%
Total	797	100%

The PCED-SP Survey collected information on the demographic characteristics, income and expenditures, assets and housing characteristics, vulnerability to shocks, coping mechanisms the household employed, participation in and utilization of social protection programs by the sample households, and household’s perception of government disaster-related programs and services.

Table 3 shows the economic profile of the households that were affected by Typhoon Yolanda in terms of income and expenditure. Due to outliers in the data and potential errors in measurement, the income quintiles were computed based on trimmed means, which reduced the sample to 731 households. The average age of

the respondents was 49 years old--with the youngest and oldest being 19 and 89 years old, respectively. In terms of education, 43% of the respondents reached or graduated from elementary school, 37% reached or graduated from high school, and about 20% reached or graduated from college.

Table 3. Average Per Capita Income and Expenditure by Quintile

Quintile	Income		Expenditure	
	Count	Average	Count	Average
1 - Poorest	158	8,579	161	12,197
2	153	15,909	150	20,177
3	145	23,734	171	29,088
4	159	36,714	163	41,558
5 - Richest	116	69,683	152	78,309
Total	731	28,935	797	35,936

Note: Income quintile is computed based on trimmed means where 5% of the highest and lowest order statistics are eliminated to provide protection against outliers.

IV. Evidence and empirical results

Upon reporting the shocks, the respondents were asked whether their households had already recovered from the negative consequences of the shocks. The response shown in Table 4 is based on a scale of the extent of recovery from not at all to complete recovery. Among the 797 Yolanda-affected households, 36% said they had not recovered at all after 6 months. Given the special attention on Tacloban in terms of mass media exposure and aid/assistance received, we examine if there is a difference in recovery in terms of geographical location. A larger percentage of those Yolanda-affected households in Leyte (which includes Tacloban), relative to outside Leyte, reported that they have not recovered at all. Focusing on the 40% poorest segment of the sample, 35% of the poor in Leyte and 30% of the poor outside Leyte said they have not yet recovered after six months. The proportion of households not at all in the process of recovery 6 months after Yolanda is comparable with the experience of the tsunami-disaster in Aceh in December 2004. One year after the fateful Aceh disaster, Oxfam (2005) reported that nearly 50% of those who lost their source of income were earning a living (Thorburn, 2009).

Table 4. Households' perceptions of recovery, by incidence

	Extent of recovery			(poorest 40%)	
	Not at all	Partial/ Full	Total	Not at all	Partial/ Full
Leyte (including Tacloban)	169 (40)	250 (60)	419 (100)	52 (35)	98 (65)
Outside Leyte	118 (31)	260 (69)	378 (100)	48 (30)	113 (70)
Total	287 (36)	510 (64)	797 (100)	100 (32)	211 (68)

Notes: Poorest 40% belongs to the Quintiles 1 and 2 based on household expenditure profile. Total Sample: Chi-Square Statistic = 7.1686, (p -value = 0.007)
Poorest 40%: Chi-Square Statistic = 0.8383, (p -value = 0.360)

Table 5 presents information according to those who have not and those who did experience partial or full recovery, and those who have not experienced full recovery are also those that have been adversely affected the most by Yolanda. When asked about the magnitude of the impact, 36% and 44% said that the adverse effect of Yolanda on their family well-being is "much" and "very much," respectively.

Table 5. Households' perceptions of recovery and impact on their well-being, by incidence

Recovery	Effect on the family well-being				TOTAL
	None	Some	Much	Very much	
Not at all	6 (2)	50 (17)	104 (36)	127 (44)	287 (100)
Partial/Full Recovery	30 (6)	244 (48)	140 (27)	96 (19)	510 (100)
Total	36 (5)	294 (37)	244 (31)	223 (28)	797 (100)

Pearson chi-square = 98.9889 Pr = 0.000

Recovery in the context of the PCED SP Survey is understood to be in terms of the households' financial well-being. After the series of probing questions on recovery, the respondent is then asked how much money would have to be given in order for them to return to their family's well-being prior to Yolanda. Table 6 presents the households' perceived monetary value of recovery. Expectedly, the amount needed of those who have not recovered is higher at a median of PhP15,000 than those who have experienced partial or full recovery at a median of PhP10,000. Respondents in Leyte also reported a higher amount needed for recovery.

Table 6. Perceived monetary value of recovery

Type of Recovery	N	Mean	Median	SD	CV	Min	Max
Not at all	287	21,651	15,000	33,756	1.56	500	300,000
Partial/Full Recovery	508	17,299	10,000	27,969	1.62	500	500,000
Outside Leyte	378	15,335	10,000	16,365	1.07	500	200,000
Leyte (+ Tacloban)	417	22,075	15,000	38,480	1.74	500	500,000
Total	795	18,870	10,000	30,237	1.60	500	500,000

The succeeding tables present the various risk management activities that the households have undertaken to deal with the consequences of Yolanda, including any assistance sought from public and private institutions. The household respondents were asked which of the following financial coping activities-- borrowing, drawing on savings, selling household assets, harvesting early, delaying investments, and mortgaging and pawning goods and assets--helped them manage the costs of the shock. Table 7 presents the response by geographical location. Among the options presented, the most frequent answers were: borrowing and spending cash savings, with 17% and 30% of the total household respondents, respectively, resorting to these financial mechanisms. Upon closer examination, the survey also reveals that among those who borrowed, the loans were mostly obtained from informal moneylenders.

To determine if the households had access to additional means to cope with the shocks aside from the financial coping activities, the household respondents were also asked whether they sought or received assistance (exclusive of loans) to bear the cost and consequences of Yolanda. Table 8 presents the incidence of seeking or receiving assistance from the government, individuals or groups, non-government organizations (NGOs) or charities. The row "Private assistance" in Table 8 combines the responses regarding receiving assistance from all parties outside of the government. Of the Yolanda-affected households, only 15% sought or received assistance from the government and 12% from private groups. A large proportion (66%) reported that they did not seek nor receive assistance from either group.

Of the 13% Yolanda-affected households that did seek or receive assistance from the government, Table 9 shows that a higher percentage came from the "poor" households (14%) than from the "non-poor" households (12%).

Table 7. Number of households utilizing financial coping activities to deal with the cost of Yolanda

Financial coping activities	Outside Leyte		Leyte (+ Tacloban)		TOTAL	
	Yes	TOTAL	Yes	TOTAL	Yes	TOTAL
Loan	61 (16)	378 (100)	74 (18)	419 (100)	135 (17)	797 (100)
Spent cash savings	110 (29)	378 (100)	127 (30)	419 (100)	237 (30)	797 (100)
Sold household assets and goods	1 (0)	378 (100)	1 (0)	419 (100)	2 (0)	797 (100)
Harvested crops in advance	7 (2)	378 (100)	1 (0)	419 (100)	8 (1)	797 (100)
Delayed/had forgone investments	0 (0)	378 (100)	0 (0)	419 (100)	0 (0)	797 (100)
Mortgaged or pawned assets	2 (1)	378 (100)	1 (0)	419 (100)	3 (0)	797 (100)
None	199 (53)	378 (100)	222 (53)	419 (100)	421 (53)	797 (100)

Table 8. Incidence of seeking or receiving assistance to bear the cost of Yolanda

	OUTSIDE LEYTE		LEYTE (+ TACLOBAN)		TOTAL - YOLANDA	
	Yes	TOTAL	Yes	TOTAL	Yes	TOTAL
Government assistance	29 (8)	378 (100)	72 (17)	419 (100)	101 (13)	797 (100)
Private assistance (Individual, group, NGO, charity)	42 (11)	378 (100)	117 (28)	419 (100)	159 (20)	797 (100)
No, did not receive nor ask for assistance	318 (84)	378 (100)	250 (60)	419 (100)	568 (71)	797 (100)

For government assistance: Pearson chi-square = 16.2465 Pr = 0.000

For private assistance: Pearson chi2(1) = 35.1732 Pr = 0.000

For those who did not receive nor ask for assistance: Pearson chi2(1) = 58.0674 Pr = 0.000

Table 9. Incidence of seeking or receiving government assistance

Region 8	Sought/Received Government Assistance		
	No	Yes	Total
Poorest 40%	267 (86)	44 (14)	311 (100)
Upper 60%	429 (88)	57 (12)	486 (100)
Total	696 (87)	101 (13)	797 (100)

Chi-Square Statistic = 1.0032; p-value = 0.317

Sought/Received Government Assistance	Income Classification		Total
	Poorest 40%	Upper 60%	
No	267 (38)	429 (62)	696 (100)
Yes	44 (44)	57 (56)	101 (100)
Total	311 (39)	486 (61)	797 (100)

Table 10 shows the number of Yolanda-affected households who simultaneously borrowed or drew on their cash savings and at the same time, received assistance from the government. Of the 135 households that borrowed, 10% also sought or received government assistance while 38% of the 237 households that spent their cash savings also sought the same.

Table 10. Incidence of borrowing and spending cash savings vs. seeking and receiving assistance

Financial Coping Mechanism	Sought/Received Government Assistance		
	No	Yes	Total
Loan	121 (90)	14 (10)	135 (100)
Not Loan	575 (87)	87 (13)	662 (100)
Total	696 (87)	101 (13)	797 (100)
Spent Cash Savings	199 (84)	38 (16)	237 (100)

Not Spent Cash Savings	497 (89)	63 (11)	560 (100)
Total	696 (87)	101 (13)	797 (100)

Loan: Pearson chi-square Statistic = 0.7784 p-value = 0.378; Cash Savings: Pearson chi-square Statistic = 3.4435, p-value=0.064

Table 11 shows that households affected by Yolanda availed of loans from mostly informal sources.

Table 11. Households' source of loans

Frequent Source of Loan	Count	Percent
SSS/GSIS/PAG-IBIG	2	(1)
Landbank/DBP	1	(1)
Rural bank	1	(1)
Credit cooperative/MFIs	4	(3)
Money lender	59	(44)
Family member	14	(10)
Friend	48	(36)
Relative	3	(2)
Company (10-Card, Inc.)	2	(1)
NONE	1	(1)
Total	135	(100)

The SP Survey asks about the various risk management activities that households have undertaken to deal with the consequences of Yolanda, including any assistance sought from public and private institutions. Risk management activities involve precautionary and *ex post* coping activities in order to smooth consumption when shocks happen (Ravago *et al.*, forthcoming). Precautionary includes both risk management and *ex ante* coping activities. Risk -management includes activities such as tying the house down (typically made of wooden materials) with ropes before an expected storm. *Ex ante* coping is preparation for things you will do after experiencing damage, e.g., financial savings, stock-piling on food, insurance, and other forms of savings.

Table 12 shows that only a few households had taken precautionary measures. Of these few, relatively more of those who did are from the upper 60% segment of the sample (Table 12a). This is to be expected since paying for insurance

premium is a cost the households have to bear. This suggests that poorer households have less ability to cope with this shock. Datt and Hoogeveen (2003), in investigating the impact of a crisis or economic shocks to Philippine households, found that the poor have limited ability to protect their consumption relative to the non-poor.

Table 12a. Incidence of taking precautionary measures by economic profile

	No	Yes	TOTAL
Poorest 40%	287 (92)	24 (8)	311 (100)
Upper 60%	436 (90)	50 (10)	486 (100)
Total	723 (91)	74 (9)	797 (100)

Pearson chi-square = 1.4883 Pr = 0.222

We have also examined whether prior experience of a shock/disaster would prompt the households to take on *ex ante* measures to cope with shocks. Out of those who had already experienced a similar shock, only 11% took long-term precautionary measures (Table 12b). Precautionary measures done after receiving warning: Tie down house with ropes, stockpile food and other essentials, move to evacuation areas, move to houses of relative and friends, move productive assets to safer places.

Table 12b. Incidence of taking precautionary measures

Experienced Shock Before	Took Long-term Precautionary Measures		
	No	Yes	Total
No	363 (92)	31 (8)	394 (100)
Yes	360 (89)	43 (11)	403 (100)
Total	723 (91)	74 (9)	797 (100)

Pearson chi-square = 1.8570 Pr=0.173

Experienced Shock Before	Took Precautionary Measures After Received Warning		
	No	Yes	Total
No	377 (96)	17 (4)	394 (100)
Yes	372 (92)	31 (8)	403 (100)
Total	749 (94)	48 (6)	797 (100)

Pearson chi-square = 4.0156 Pr = 0.045

We now investigate the factors that determine the partial or full recovery of households. The SP Survey inquires about the various risk management activities

that households have undertaken to deal with the consequences of Yolanda, including any assistance sought from public and private institutions.

We use the *logit* model given in equation (1) to determine which among the risk management activities available to households contribute to the probability of partial-to-full recovery of the households. The left-hand side takes on the value 1 when the respondent experiences partial or full recovery; 0 otherwise.

$$\Pr(Y = 1 | X, N, \alpha, \beta) = \frac{\exp(\alpha N + \beta X + u)}{1 + \exp(\alpha N + \beta X + u)} \quad (1)$$

The various risk management activities undertaken by households is represented by N . These include precautionary measures taken by the households to help them cope with shocks. Utilization of *ex ante* coping activities involves drawing on financial savings, selling household assets, harvesting early, delaying investments, mortgaging and pawning goods and assets. *Ex post* financial coping activities to help the households manage the costs of the shock include borrowing and receiving government assistance. We control for initial conditions of the households prior to the typhoon, denoted by X , such as educational attainment, age, and gender of the household head and whether the household is a beneficiary of the conditional cash transfer (CCT) program of the government. The latter served as indicator for identifying poorest of the poor households. The error term is represented by u .

The results of the *logit* model are shown in Table 13a and 13b. The final mode showing only the significant coefficients are presented in Table 13b. There are several interesting outcomes gleaned from this model. For the households that took precautionary measures before Yolanda, the probability of partial to full recovery after the disaster increases by about 23 percentage points (marginal effect), controlling for other factors. For households with cash savings and utilized such savings, the probability of partial to full recovery increases by about 8.5 percentage points relative to households without savings. For households who availed of loans, the probability of partial to full recovery increases by about 10 percentage points; It is important to note that majority of the loans were from informal moneylenders, relatives, and friends. The reasons cited for not accessing the formal sources are steep requirements inconsiderate of the special circumstances surrounding *Yolanda*.

Table 13a. What influences recovery (Full Model)

Dependent Variable: Household has Partially/Completely Recovered			
Explanatory Variables	Coeff.	Robust	
		SE	P-value
Took precautionary measures	1.31	0.38	0.00
Took out loans	0.51	0.23	0.03
Spent cash savings	0.34	0.19	0.07
Sold products or crops in advance	1.53	1.02	0.14
Reduced expenses on education	-0.20	0.35	0.55
Reduced expenses on utilities	-0.69	0.26	0.01
Reduced expenses on recreation	-0.53	0.23	0.02
Stopped schooling	-0.32	0.39	0.41
Moved to another area	-0.88	0.64	0.17
Received government assistance	-0.97	0.27	0.00
Private assistance	0.22	0.21	0.29
Household head is elementary graduate	0.44	0.24	0.07
Household head is high school undergraduate	0.26	0.28	0.36
Household head is high school graduate	0.44	0.23	0.06
Household head is college undergraduate	0.39	0.28	0.16
Household head is college graduate	0.79	0.39	0.04
Age of household head	-0.01	0.01	0.32
Sex of household (Male = 1)	-0.10	0.24	0.68
Household has other sources of income	0.12	0.25	0.64
Poor (CCT) household	-0.22	0.24	0.36
Interaction: HH getting gov't assistance and poor (CCT) household	1.14	0.59	0.05
Agricultural household	-0.03	0.20	0.90
Household experienced similar shock before	-0.66	0.16	0.00
Leyte household	-0.40	0.17	0.02
Constant	1.21	0.51	0.02

Number of Obs. = 793; Log pseudolikelihood = -467.38356 (p-value=0.0000);
McFadden R-square = 0.0957

Table 13b. Factors that influence recovery (Final Model)

Dependent Variable: Household's partial/complete recovery = 1				
Explanatory Variables	Coeff	Robust SE	P-value	Marginal effect
Took precautionary measures	1.329	0.375	0.000*	0.229
Took out loan	0.527	0.232	0.023*	0.105
Spent cash savings	0.416	0.182	0.022*	0.085
Sold products or crops in advance	1.650	1.067	0.122	0.253
Received government assistance	-0.886	0.251	0.000*	-0.195
Household head is elementary graduate	0.415	0.236	0.078*	0.083
Household head is high school undergraduate	0.284	0.277	0.305	0.057
Household head is high school graduate	0.411	0.225	0.068*	0.083
Household head is college undergraduate	0.306	0.279	0.273	0.062
Household head is college graduate	0.876	0.385	0.023*	0.162
Age of household head	-0.007	0.006	0.248	-0.001
Sex of household (Male = 1)	-0.128	0.233	0.582	-0.026
Poor (CCT) household	-0.358	0.218	0.101	-0.076
Interaction: Household getting gov't assistance and poor (CCT) household	1.305	0.552	0.018*	0.217
Household with prior experience of similar shock	-0.628	0.160	0.000	-0.132
Leyte Household	-0.315	0.160	0.049	-0.066
Constant	1.065	0.505	0.035	

Notes: Number of Obs. = 795; Log pseudolikelihood = -478.36763 (p -value=0.0000); McFadden R -square = 0.0779; *significant at 10% level.

Is government assistance making a difference in recovery? A higher percentage of poor households received government assistance compared to non-poor households. Table 2 shows that the probability of partial to full recovery for households who received government assistance after Yolanda (unconditional assistance) differs between poor (CCT beneficiaries) and non-poor (non-CCT) by 2.2 (-0.195 + 0.217 = 0.022) percentage points, with poor having positive incremental effects from having received government assistance on average. In other words, 2.2 percentage points is the positive incremental effect on the probability of recovery for receiving government assistance as the status of household changes from non-poor to poor. For non-poor households, the financial impact of typhoon Yolanda is tremendous, such that government assistance is not enough to contribute to their immediate recovery.

Since the respondents were asked to recall any shock they experience since January 2009, there are households who had experienced a similar shock prior to Yolanda. For these households, the probability of recovery decreases by 13.2 percentage points (see variable 'household with prior experience of similar shock'). This implies that these households may have not yet fully recovered from the previous shock.

A dummy variable for Leyte is added, given the special attention that the area attracted. It has been found to be significant--with the probability of recovery decreasing by 6 percentage points if the household resides in Leyte.

To control for the endogeneity of the explanatory variables such as the household taking out loans and spending cash savings, interaction terms of the variables with the education of the household head are included in the other models. The results of the full model with the interaction terms show mostly insignificant coefficient (Table 12), implying that the model without the interaction terms can sufficiently explain the determinants of recovery.

Table 14. What influences recovery (Full Model) with Interaction Terms

Dependent Variable: Household's partial/complete recovery = 1			
Explanatory Variables	Coeff.	Robust SE	P-value
Took precautionary measures	1.383	0.386	0.000
Took out loan	0.380	0.408	0.352
Spent cash savings	0.307	0.406	0.450
Harvested/Manufactured products or goods	1.649	1.006	0.101
Reduced expenses on education	-0.241	0.353	0.494
Reduced expenses on utilities	-0.741	0.261	0.005
Reduced expenses on recreation	-0.517	0.235	0.028
Stopped schooling	-0.351	0.398	0.377
Moved to another area	-0.878	0.686	0.201
Received government assistance	-0.998	0.269	0.000
Private assistance	0.269	0.208	0.197
Household head is elementary graduate	0.229	0.321	0.475
Household head is high school undergraduate	0.199	0.345	0.565
Household head is high school graduate	0.422	0.301	0.160
Household head is college undergraduate	0.215	0.380	0.571
Household head is college graduate	1.451	0.606	0.017
Age of household head	-0.007	0.006	0.291
Sex of HH (Male = 1)	-0.100	0.240	0.677
HH has other sources of income	0.066	0.252	0.792
Poor (CCT) household	-0.229	0.241	0.342
Interaction: Household getting gov't assistance and poor (CCT) household	1.200	0.598	0.045
Agricultural household	-0.033	0.198	0.867
Household experienced similar shock before	-0.679	0.167	0.000
Leyte household	-0.407	0.176	0.020
Interaction: Loan and household head is elementary graduate	1.185	0.696	0.089
Interaction: Loan and household head is high school undergraduate	0.324	0.854	0.704
Interaction: Loan and household head is high school	-0.305	0.617	0.621

graduate			
Interaction: Loan and household head is college undergraduate	0.428	0.872	0.624
Interaction: Loan and household head is college graduate	-1.005	1.069	0.347
Interaction: Spent cash savings and household head is elementary graduate	0.072	0.564	0.898
Interaction: Spent cash savings and household head is high school undergraduate	0.029	0.773	0.971
Interaction: Spent cash savings and household head is high school graduate	0.162	0.533	0.762
Interaction: Spent cash savings and household head is college undergraduate	0.342	0.601	0.569
Interaction: Spent cash savings and household head is college graduate	-1.084	0.815	0.183
Constant	1.297	0.539	0.016

Number of Obs. = 793; Log pseudolikelihood = -463.23703 (p-value=0.0000); McFadden R-square = 0.1055

V. Concluding remarks

Six months after the fateful Yolanda disaster in November 2013, we find that 36% of affected households have yet to experience even partial recovery from the shock. This proportion is comparable with the tsunami-disaster experience of Aceh in December 2004. Utilizing the data from the PCED-SP Survey, we investigate what factors influence the partial or full recovery of the households.

Households who had taken precautionary measures prior to Yolanda have higher chances of recovery. Precautionary measures include savings, asset accumulation, and various instruments of (mostly informal) insurance that can be drawn upon to cope with disaster. The regression results show that taking precautionary measures provides highest marginal contribution to recovery. This highlights the policy implication of investing in disaster-preparedness. This also emphasizes the need for education and emphasizing the importance of taking precautionary measures.

Yolanda-affected households also employed a suite of coping activities. The result of the regression model finds that borrowing and utilizing savings contribute to recovery. The study also shows that households borrow mostly from informal moneylenders and that formal institutions are not utilized in times of disaster. An important policy implication relates to the extension of emergency credit from formal institutions inasmuch as ease of access to credit is crucial to recovery. Institutional details need to be worked out, such that these loans can still have a high repayment rate.

The prospects of recovery are high for poor households that are poor or those who received conditional government assistance. For non-poor households with major losses, traditional relief efforts are likely to be insufficient in facilitating

their immediate recovery. On the other hand, the prospects of recovery are relatively lower for households who experienced a similar shock/disaster before and also for those who are located in Leyte.

References:

- Capuno, J., A. Kraft, S. Quimbo, and A. Tan. 2013. "Shocks to Philippine households: incidence, idiosyncrasy, and impact. *Philippine Review of Economics*, 50(2): 1-27
- Datt and Hoogeveen (2003). "El Niño or El Peso? Crisis, Poverty, and Income Distribution in the Philippines," *World Development*, 31(7):1103-1124.
- National Economic and Development Authority (NEDA). 2013. *Reconstruction Assistance for Yolanda*, Accessed October 2014. http://www.neda.gov.ph/wp-content/uploads/2014/10/ra_ver2_final.pdf
- Oxfam. 2005. Back to work: how people are recovering their livelihoods 12 months after the tsunami. *Oxfam Briefing Paper* No. 84, Oxfam, London.
- Ravago, M.V., J. Roumasset, and K. Jandoc. (Forthcoming). "Risk Management and Coping Strategies: Climate Change and Agriculture in the Philippines," in M. Rosegrant, A. Balisacan, M. Sombilla, *The Future of Philippine Agriculture: Scenarios, Policies, and Investments under Climate Change*.
- Thorburn, C. 2009. "Livelihood recovery in the wake of the tsunami in Aceh". *Bulletin of Indonesian Economic Studies*, 45(1): 85-105.