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The Impact of Insurance Games on Health Insurance Enrollment: Experimental Evidence from the Philippines

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Abstract

This paper evaluates how playing an experimental insurance game affects real-life health insurance enrollment for the poor. Experimental insurance games not only allow individuals to learn about insurance, but also experience it. Based on a lab-in-the-field experiment in the rural Philippines involving an insurance game in 2010, complemented by a follow-up survey in 2013, I find that playing the insurance game significantly increases enrollment in the country's social health insurance scheme, particularly in the scheme targeted towards the poorest 25 percent of the population. Two insights from behavioral economics – the role of emotions in financial decision-making and the role of "nudges" or behavioral policy interventions that help people overcome procrastination – can help explain the impact of the experimental game on real-life insurance enrollment.

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Conducting field experiments to understand human behavior has become increasingly popular in economic research (Harrison and List, 2004; Levitt and List, 2009; Viceisza, 2012). One of the appeals of field experiments is that they allow researchers to observe how people actually make choices (Viceisza, 2012). It is natural then to ask whether field experiments themselves affect people's subsequent choices once the experiment is over. For this purpose, I examine the impact of a lab-in-the-field experiment[1] involving insurance games on participants' real-life insurance enrollment.

It is plausible to imagine that participating in lab-in-the-field experiments induce changes in later behavior that are not intended by the experimenter. Research in social cognition has shown that beliefs, attitudes, goals, and behavior can be unconsciously affected as part of research processes (Machin and Fitzsimons, 2005). Psychology and marketing research has also long recognized that surveying a subject can induce later behavioral change by making certain risks or choices more salient than they would be otherwise (Zwane et al., 2011). A causal relationship between completing a household survey and subsequent behavioral change has been documented using health field experiments (Zwane et al., 2011). Such unintended consequences can be beneficial or harmful depending on the context. For example, if lab-in-the-field experiments involving insurance games give participants a favorable view of insurance in a region where insurance fraud is common, then consequent behavioral change might prove to be more harmful than beneficial.

To examine the impact of a lab-in-the-field experiment on subsequent behavior change, I rely on an experiment conducted in 2010 in the rural Philippines and a follow-up survey conducted three years later in 2013. The lab-in-the-field experiment involved playing an insurance game and was designed to test the impact of different insurance products on solidarity in risk-sharing groups among rural villagers (Landmann et al., 2012). The game included a risk component and an insurance component[2], and lasted approximately half a day. In the process, the game also allowed participants to experience and learn about insurance.

The results from the follow-up survey show that those who participated in the game in 2010 are 6.6 percentage points more likely to have enrolled in the Philippine Health Insurance (PhilHealth) scheme in 2013 compared to the enrollment rate of 45.4 percent in the control group. PhilHealth is the Philippines' social health insurance scheme that aims to provide universal health insurance coverage. PhilHealth has five different plans, one of which—the Sponsored Program—targets the poorest 25% of the Philippines' population. Under the

[1] Harrison and List (2004) offer a comprehensive overview of field experiments. They also propose the following taxonomy of field experiments: artefactual field experiment, framed field experiment, and a natural field experiment. Artefactual field experiments are also termed lab-in-the-field experiments.
[2] The insurance game was not framed in the type of insurance offered.

Sponsored Program, premiums are covered, but enrollment is voluntary (Silfverberg, 2014). The results confirm that those who played the game are more likely to enroll in the Sponsored Program than those who did not play the game.

To investigate the channels of the impact, I consider several outcomes related to attitudes and knowledge. When comparing the outcomes for the treated and the control groups, I find that the game has a significant effect on risk attitudes, with those who played the game in 2010 displaying more risk aversion than the control group. This is as opposed to Cai and Song (2015) who find no impact of insurance games on risk attitudes. The opposing result could be because Cai and Song (2015) consider immediate impact whereas I consider a long-term impact on risk attitudes. Although the results suggest that the game treatment leads to increased risk aversion, it is not possible to disentangle whether this effect is purely due to playing the game or stems from enrolling in insurance after playing the game. The experimental game has no impact on insurance knowledge or perceived probability of future disasters, which is consistent with Cai and Song (2015). As suggested qualitatively by Patt et al. (2009) that experimental games might help build trust, I test whether the game has an impact on trust in insurance providers and find no impact.

Two insights from behavioral economics shed some light on why we might see an impact of experimental games on real-life decision-making. First is the role of emotions in financial decision-making. There is significant evidence linking remembered, experienced, and anticipated emotions with the decision-making process (Patt et al., 2009). Hence, game participants might be more open to enrolling in insurance when encountered with this decision in real-life, having previously experienced insurance albeit in an experimental setting. A second theoretical insight comes from the idea of "nudges" that is, behavioral policy interventions that help people help themselves (Thaler and Sunstein, 2008; Baicker et al., 2012). As such, participating in games might give people the push they need to overcome procrastinating (Baicker et al., 2012).

The studies that come closest to the present study is by Gaurav et al. (2011), Norton et al. (2012), and Cai and Song (2015). In Gaurav et al. (2011), participants are offered a financial literacy training involving insurance games and then offered a choice of insurance following the training. The training and education program increase take-up by 5.3 percentage points, relative to a take-up rate in the control group of 8.7 percent. Norton et al. (2012) conduct experimental insurance games in Ethiopia to examine whether the games lead to increase in take-up of index insurance. Insurance is offered as part of a larger program run by a development agency together with insurance companies to help poor farmers manage risks better. The authors observe an increase in take-up from 15.75 percent in the control group to

20.36 percent in the treatment group. Cai and Song (2015) play insurance games with farmers in rural China who are then asked to think about whether they would like to buy the insurance and that the experimenters would come back a few days later to ask them for their purchase decision. The purchase decision is conveyed to their partner insurance company, who then collects the premium. The authors find that playing insurance games with farmers in rural China increases take-up of insurance by 9.6 percentage points, which is a 46 percent increase relative to the baseline take-up rate of 20 percentage points. In both studies, the primary motivation was to test the impact of insurance games on insurance take-up, and as such insurance choice was offered right after the insurance games as part of the study design.

The present study differs from the aforementioned studies in two major ways: firstly, insurance decision in the present study is completely independent of the game and occurs at no prescribed timing. Secondly, this study tests whether the effects persist over a period of three years as compared to a few hours or a few days. Offering insurance choice as part of the experiment, which is what has been done in previous studies, lends to two limitations. First, when insurance is made readily available as part of the experiment, this ignores the transaction costs, such as long waiting lines, traveling times, etc. that present a formidable barrier to insurance take-up in many cases. Hence, this does not accurately reflect demand for insurance. Second, offering insurance choice as part of the experiment can create experimenter demand effect i.e., participants choose the decision they think the experimenters would like them to take. Moreover, in case of Cai and Song (2015), the insurance premium was deducted from an agricultural subsidy that all study subjects were eligible for, which solves the problem of liquidity constraints (Olapade and Frölich, 2012). As the present study looks at insurance enrollment in the country's social health insurance scheme, it circumvents the aforementioned limitations. Moreover, the results in previous studies are limited to the short-term, so we do not know whether take-up rates persist a few years down the line.

This study also contributes to a growing literature on the role of financial literacy training programs in enabling individuals to make financial decisions. As Viciesza (2012) notes, lab-in-the-field experiments can also serve as an educational tool. As such, experimental games can be considered as part of a broader program geared towards improving financial literacy. Carter (2008) and Hill and Viciesza (2012) have highlighted this anecdotally for experiments involving index-based insurance contracts in developing countries. These authors report that experiments also serve the purpose of explaining difficult concepts, such as how insurance contracts work, to rural farmers with low levels of financial literacy; however, the lab-in-the-field experiments in their studies were not designed for this purpose. Cai and Song (2015) test for the impact of their insurance game on insurance knowledge and find that it does not have

an impact. Hence, the results are still inconclusive regarding the impact of insurance games on insurance knowledge.

The results here provide suggestive evidence of how financial literacy programs directly and indirectly influence insurance enrollment. Studies on insurance enrollment in low-income populations reveal several prominent barriers to it, including limited financial literacy (Acharya et al., 2013; Eling et al., 2014). Health shocks have significant negative effects on the poor's financial situation (Islam and Maitra, 2012; Wagstaff and Lindelow, 2014). Many low- and middle-income countries have implemented social health insurance schemes to alleviate the financial burden of healthcare. However, enrollment in such schemes tends to be very low, especially among the poorest segment of the population (Acharya et al., 2013). The results of this analysis will thus be useful to insurers and policymakers engaged in using financial literacy programs to make insurance more familiar and understandable to the rural poor.

The structure of the paper is as follows. Section I presents information on the institutional background, including the country and health sector context, PhilHealth's Sponsored Program, and the survey setting. Section II discusses the research design and the main hypotheses of the paper. Section III focuses on the empirical results. Section IV offers behavioral explanations for the results and section V concludes.

I. Institutional background

A. Country and health sector context

The Republic of the Philippines is a lower-middle-income country with a population of 94.9 million (Chakraborty, 2013) and national average family income of 235,000 Pesos[3] (NSO, 2012). The country has experienced sustained economic growth since 2001, with growth in 2013 recorded at 7.2% (Chua et al., 2014). However, poverty is not decreasing in line with this growth, changing just barely from 26.3 percent in 2009 to 25.2 percent in 2012, suggesting that higher growth has yet to benefit many of the poor (Chua et al., 2014). The informal sector is large, comprising 50 percent of the population (Chakraborty, 2013). While health outcomes at the aggregate level have improved significantly in the Philippines, inequalities in health outcomes are worsening (Chakraborty, 2013).

The Philippines has one of the longest histories of social health insurance in Southeast Asia with its roots going back to the 1970s when the country introduced the Medicare Program for formal-sector employees (Lavado, 2010). While Medicare was initially intended to expand

[3] Equivalent to approximately USD 5375.12 as of August 2014, at an exchange rate of 1 USD = 43.72 Pesos.

coverage to informal-sector workers as well, the program was not successful at enrolling other groups (Chakraborty, 2013). In 1995, PhilHealth, the Philippines' social health insurance scheme, was established to provide universal health insurance coverage (PHIC, 2012).

PhilHealth has five plans: (1) the Overseas Worker Program for overseas contract workers, (2) the Employed Program for employees in the government and private sector whose premiums are jointly covered by the employee and the employer, (3) the Individually Paying Program for self-employed professionals who voluntarily contribute to the program, (4) the Lifetime Program for retirees and pensioners, and (5) the Sponsored Program for indigents, that is, the poorest 25% of the Philippines' population, whose premiums are covered by the national government and local government units or by private individuals and companies (PHIC, 2012).

B. PhilHealth 'Sponsored Program'

The PhilHealth plan most relevant for the sample in this study is the Sponsored Program, which is targeted at the poor. To enroll in the Sponsored Program, a person needs to go to the local office of the Department of Social Welfare and Development, which will then determine whether the individual is qualified to join the program and, if so, endorse the person appropriately (PHIC, 2012). To qualify, the person must belong to the lowest, income-wise, 25 percent of the Philippine population or be listed in the National Household Targeting System for Poverty Reduction. Those who are not listed can still avail themselves of the Sponsored Program via the "point-of-care enrollment program" (PHIC, 2013). This program targets the poor nonmembers who are confined in government hospitals. The premiums are paid by the sponsoring hospital. In addition, the local government units can fully or partially subsidize the membership of persons not listed as poor. The list is based on a proxy means test that estimates family income based on various socioeconomic variables such as ownership of housing, education of the household head, livelihood of the family, and access to water and sanitation facilities, among others (Fernandez and Olfindo, 2011). While the local government units are encouraged to enlist their indigent constituents in the program, enrollment by households can still be considered voluntary (Silfverberg, 2014).

***Coverage**:* The Sponsored Program may cover households or individuals depending on the category to which a person belongs. The following members of the household are covered under PhilHealth without additional premiums: legal spouse, child or children, and parents who are 60 years old and above (PHIC, 2012).

Barriers to enrollment: Although coverage by the Sponsored Program has expanded over the past few years,[4] the majority of provinces experience mild to extreme leakages in the program. A significant number of families not part of the targeted indigent population are included and many truly poor households are excluded from the program (Silfverberg, 2014; PIDS, 2010). Factors that contribute to this under-coverage are related to lack of hospital services, availability of health professionals, and governance of the local government units that are ultimately responsible for enrollment. A study on underutilization of PhilHealth services reveals a lack of knowledge about PhilHealth benefits as well as a cumbersome and unmanageable process, which add to the transaction costs of enrollment, as prime contributors to this situation (Faraon et al., 2013).

C. Setting

The study was conducted in the Iloilo province of the Western Visayas. Educational attainment in this province is slightly below the national average, poverty is higher, and public health insurance coverage is about average (Landmann et al., 2012). Average annual family income in the region is 204,000 Pesos (NSO, 2014). Iloilo province had a population of 1.8 million in 2013 and an average household size of 4.8 (NSO, 2014). To my knowledge, there are no changes in the PhilHealth registration process between the time of the insurance game in 2010 and the follow-up survey in 2013.

II. Research design

A. Experimental game

The study is based on a randomized lab-in-the-field experiment in 2010 that involved playing an insurance game. The experiment was originally designed to test the impact of different insurance products on solidarity in risk-sharing groups among rural villagers (Landmann et al., 2012). As Landmann et al. (2012) describe in their paper, the game in 2010 includes a risk component and an insurance component, and lasted approximately half a day.[5] At the beginning of the game, every participant receives an initial endowment of 200 Pesos. There are three different options or treatments. Within each treatment, risk is introduced via rolling a dice where the outcome of the dice roll decides whether and how much a participant is allowed to keep of her initial endowment. If the dice roll shows a 1, 2 or 3, then there is no loss; 4 or 5 implies a medium shock where participants lose half of their endowment i.e., 100 Pesos; and 6 implies a catastrophic shock where participants lose almost everything i.e., 180

[4] The actual coverage of the PhilHealth Sponsored Program is unclear; PhilHealth reports universal coverage. An independent study, however, estimates that PhilHealth coverage is only 52%, and the latest demographic and health survey reports that coverage is only at 38% (PIDS, 2010).
[5] In what follows, the description of the game in 2010 is adapted from Landmann et al. (2012).

Pesos. The three treatments include one without insurance, option A, and two with insurance coverage, options B and C. The two insurance treatments vary in their premiums and the type of losses covered. Option B costs 45 Pesos and half of all losses are covered whereas option C costs only 20 Pesos and half of only the catastrophic loss is covered. The game is played in three rounds but the payout is based on the results of one round only, which is chosen randomly after all three rounds have been completed. Before the start of the game, the game instructor explains the game to all participants together with graphical instructions. The participants are asked a set of questions to test their understanding of the game. If a participant makes a mistake, the research assistants explain the setup and the concepts one more time. Only those who answered all questions correctly were allowed to participate. Only a few participants were excluded. The complete experimental procedure is given in Landmann et al. (2012).

B. Data collection

The experiment was conducted in the fall of 2010 with low-income households in rural or semi-urban areas.[6] A two-stage random sampling procedure was employed whereby in the first stage a sample of 24 barangays (lowest administrative level in the Philippines, comparable to a village) was randomly selected. In the second sampling stage, eight households were randomly chosen within each barangay after obtaining a complete list of households from the barangay officials. Only the household head or the spouse of a household head was allowed to take part in the game. The household heads were asked to bring two peers along. The sample size varied from 15 to 24 per village. The total number of observations is 513.[7] Table B1 in Appendix B reveals that the invited and the peer groups in 2010 are balanced along a number of household and individual characteristics. Hence, I consider all 513 observations as part of the treated sample in 2010.

A follow-up survey of the game participants was conducted at the end of 2013, together with a survey of a randomly selected control group from the same barangays. At the time of the experiment in 2010, no control group was surveyed; hence in 2013, from each of the 24 barangays, a randomly selected sample of 18 to 24 individuals per barangay was chosen to create the control group. A great deal of care was taken to ensure that those in the control group in 2013 are from the pool of those from whom the treatment group in 2010 was chosen. In particular, only those who had been living in the barangay in 2010 were randomly chosen. The control group is comprised of 575 observations. The follow-up survey collected information on socio-demographic characteristics; social networks; shocks and insurance

[6] The description of data collection for the 2010 game is adapted from Landmann et al. (2012). The number of barangays and total participants in Landmann et al. (2012) is smaller as they exclude their two pre-test barangays. Like Landmann et al. (2012), those over the age of 70 are not considered.

[7] Of the total respondents invited, compliance was very high as most of those invited attended the game.

purchase and experience; math, numeracy, and probability skills. Math skills were tested using a set of eight questions as in Cole et al. (2013), probability skills using a set of two questions as in Weller et al. (2013), and numeracy skills using a set of three questions as in Schwartz et al. (1997) (see Appendix A, Table A1, for the questions).

Of the 513 original participants, 458 (89.3%) were contacted. Table C1 in Appendix C provides information on attrition. About half the respondents who could not be reached had either migrated domestically or abroad; the other half could not be found either because they were not available at the time of the interview or because they had passed away. If attrition was correlated with treatment assignment and thus differed between treated and control group, then this could potentially bias the impact estimates. However, looking at the reasons of attrition, it seems highly unlikely that the insurance game led to participants migrating or not being around for the interview.

C. Summary statistics

As the game was played in 2010, during the follow-up survey, the game participants were asked how much of the game they remembered. More than 25% of the participants said that they remembered all or most of the game and over 60% reported remembering some of the game.

Household characteristics

Panel A of Table 1 presents household characteristics for the treated and control groups. Column 1 presents the sample mean for a series of characteristics. The average household size is 4 and average annual household income is about 96,230 Pesos, which is far below the national average of 235,000 Pesos but similar to the average household income of the poorest 20 percent in the Philippines, which is 92,000 Pesos (NSO, 2012). More than 60 percent of the households reported having savings. More than a quarter of individuals reported skipping meals in the past three months for financial reasons, which provides an indication of poverty. A majority of respondents own their dwelling (88%), have access to safe drinking water[8] (69%), and have access to improved sanitation[9] (78%).

[8] Access to safe drinking water was assessed based on whether the households indicated having piped water, obtained water from a protected well, or used bottled water.

[9] Access to improved sanitation was assessed based on whether the households indicated having a private flush toilet or a closed pit latrine.

Table 1: Summary statistics and balance check for treated and control groups

	Sample mean (1)	Control group (2)	Treatment group (3)	Equality of means *p*-value (4)
		Panel A: Household characteristics		
Household size	4.17	4.09	4.27	0.18
	(2.13)	(2.11)	(2.16)	
Log of household income (annual) (in Pesos)	10.83	10.77	10.90	0.18
	(1.57)	(1.66)	(1.44)	
Household has savings	0.61	0.61	0.61	0.98
	(0.48)	(0.48)	(0.48)	
Skipped meals in the past 3 months	0.28	0.27	0.29	0.56
	(0.44)	(0.44)	(0.45)	
Household owns house	0.88	0.88	0.87	0.43
	(0.32)	(0.31)	(0.33)	
Access to safe drinking water	0.69	0.69	0.70	0.88
	(0.46)	(0.46)	(0.46)	
Access to improved sanitation	0.78	0.77	0.79	0.28
	(0.41)	(0.42)	(0.40)	
		Panel B: Individual characteristics		
Female	0.66	0.66	0.70	0.16
	(0.46)	(0.47)	(0.45)	
Married	0.80	0.79	0.81	0.33
	(0.40)	(0.40)	(0.39)	
Financially responsible	0.96	0.96	0.97	0.45
	(0.19)	(0.20)	(0.17)	
Age	44.13	42.06	46.72	0.00***
	(11.68)	(10.99)	(12.01)	
Education (years completed)	11.16	11.24	11.06	0.44
	(3.60)	(3.67)	(3.5)	
Log of individual income (annual) (in Pesos)	6.85	6.79	6.92	0.65
	(4.68)	(4.75)	(4.59)	
Fatalism (out of 14)	9.79	9.7	9.9	0.34
	(3.03)	(3.06)	(2.99)	
Math score (out of 8)	6.04	5.96	6.15	0.09*
	(1.81)	(1.83)	(1.78)	
Probability score (out of 2)	1.00	0.98	1.02	0.43
	(0.76)	(0.75)	(0.76)	
Numeracy score (out of 3)	0.62	0.59	0.65	0.20
	(0.72)	(0.68)	(0.76)	
Types of self-reported shocks in the past 3 years	1.36	1.30	1.42	0.07*
	(1.07)	(1.08)	(1.07)	
Self-reported health shocks in the past 3 years	0.64	0.61	0.67	0.05*
	(0.49)	(0.49)	(0.49)	
No. of barangay officials in contact with[10]	5.24	4.59	5.89	0.10
	(4.78)	(2.77)	(6.12)	
Observations	1,033	575	458	

Notes: This table reports sample means and tests for balance between the treated and control groups in 2013. Panels A and B give sample means for household and individual characteristics, respectively. Standard deviations are reported in parentheses. The *p*-values of a *t*-test are reported in Column 4.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Individual characteristics

In terms of individual characteristics, the sample is mostly female (66%) and married (80%), as seen in Panel B of Table 1. Close to half the respondents are household heads and more

[10] Only 73 respondents in the treatment group and 73 in the control group responded "yes" to knowing barangay officials.

than 95% are involved in financial decision-making in the household. Respondents are around 44 years old and have completed 11 years of schooling. The average annual income is approximately 28,000 Pesos. Individuals scored very high on fatalism.[11] I also administered short tests of math, numeracy, and understanding probabilities, which are strongly correlated with financial literacy (Carpena et al., 2011). The average respondent correctly answered 6 out of 8 questions on math skills and 1 out of 2 questions on understanding probabilities. Respondents fared worse on numeracy skills, with the average respondent answering none of three questions correctly.

When asked if they had experienced any shocks (health, fire, theft, agricultural price changes, and weather) in the past three years, the average respondent said he or she had experienced more than one shock. About 64% of the respondents reported having experienced health shocks in the past three years. Other commonly experienced shocks were bad weather conditions affecting agriculture and livestock (approximately 40%) and agricultural price changes affecting agricultural inputs (approximately 30%) (see Table C2 in Appendix C). When asked about their most important coping mechanisms for health shocks, 64% of the respondents indicated borrowing money and 25% reported using own financial resources (see Table C3 in Appendix C). Only 3% indicated using insurance as a coping mechanism. A vast majority of the respondents (86%) noted lack of money as their primary reason for not buying insurance, followed by lack of trust (5%) (see Table C4 in Appendix C). Only about 2% of the respondents reported lack of knowledge as a reason for not buying insurance. However, since the Sponsored Program of PhilHealth is offered for free, the results from the survey indicate that individuals actually have little knowledge of the program.

In terms of social contacts, respondents, on average, reported knowing five barangay officials. Having contact with barangay officials is an important indicator of one's social status in the village and may also influence insurance enrollment as barangay officials carry out the administrative process of enrolling members in PhilHealth.

To test for balance across groups, Columns 2 and 3 of Table 1 present the means in the control and treatment groups, respectively. Column 4 presents the *p*-value for a *t*-test of the equality of means across the two groups. As to differences in household characteristics (Panel A), the groups appear balanced overall, as expected due to the randomized assignment to treatment. Furthermore, most of the individual characteristics are also balanced across the two groups, except for age, number of shocks experienced**,** and math ability (see Panel B of Table 1). Those in the treatment group are slightly older than the control group, even though great

[11] Fatalism is measured by evaluating responses to two items: "I have little control over what will happen to me in my life" and "Good things tend to happen to other people, not to me or my family."

care was taken to ensure that the control group in 2013 is taken from the pool that was eligible to participate in the game in 2010. One possible reason for this age difference is that in the 2010 treatment group, the household received the invitation and either the household head or the spouse could attend the game. In the 2013 control group, the person who was randomly selected was interviewed. If in the 2010 game the older household heads or older spouses attended the game, then age would be higher in the treatment group. Moreover, math ability is also slightly higher in the treatment group than in the control group. However, other indicators of mental ability, such as education, probability skills, and numeracy skills, are not different for the two group; hence, it is hard to explain the difference in math skills between the two groups.

In addition, the self-reported type of shocks experienced in the past three years is slightly higher in the treatment group than in the control group. The proportion of those in the treatment group reporting health shocks is higher than those in the control group. I check to see whether there is any correlation between age and self-reported shocks as it is likely that older participants have experienced more types of shocks. However, I find that there is no correlation between age and types of shocks. As these are self-reported shocks, it could be that the treatment and the control group perceive shocks differently due to their participation (or not) in the game. Olapade and Frölich (2012) also find that the shock history for death and hospitalization between the treatment and the control group is different and suggest that the control group might be underreporting such health events compared to the treated group, which might be a direct result of the treatment.

As income is an important criterion in determining enrollment status in the Sponsored Program, it is important that not only the means of individual income and household income across treatment and control groups are balanced, but also that overall distribution is similar. Figure D1 (see Appendix D) shows that distributions of both individual and household income look very similar.

III. Results

This section presents the results from the experiment, also referred to as the "game." Randomization of game assignment in 2010 allows measuring the causal impact of the insurance game on different outcome variables. The cross-section estimator, which compares mean outcomes of participants and non-participants at time t, gives unbiased estimates under the assumption that selection into treatment is exogenous (Heckman, LaLonde, and Smith, 1999).

A. Impact on insurance enrollment

I first analyze the game's impact on insurance enrollment and indicators related to enrollment. The average impact of the game on insurance enrollment will be estimated using the following equation:

$$(1)\ Y_i = \alpha + \beta Game_i + \theta X_i + e_i$$

where Y_i is an indicator for whether or not the individual is enrolled in the PhilHealth scheme and $Game_i$ is an indicator variable that captures whether the individual played the game in 2010. X_i includes individual- and household-level covariates. In a simple randomized experiment, controlling for covariates that are likely to influence the outcome does not affect the expected value of an estimator of β, but it can reduce its variance (Duflo et al., 2006). Individual-level covariates include respondent's age, gender, education, household head status, whether the respondent is responsible for household financial decision-making, and measures of math, probability, and numeracy skills. Household-level covariates are household size and whether the household owns its dwelling. Covariates that might have been affected by the treatment are not included. The covariates are selected based on previous literature that highlights the relevance of these factors in insurance demand and take-up (Eling et al., 2014).

Table 2: Impact of game on PhilHealth enrollment

Independent variables	(1) OLS	(2) OLS	(3) OLS
	Panel A: Average treatment effects		
Game	0.066**	0.058*	0.054*
	(0.031)	(0.032)	(0.032)
Intercept	0.454***	0.197	-0.004
	(0.021)	(0.119)	(0.132)
	Panel B: Control variables		
Individual controls		Yes	Yes
Household controls			Yes
	Panel C: Model		
Observations	1,033	1,033	1,033
R^2 adj.	0.000	0.012	0.032
Mean of dep. var. (total sample)	0.483	0.483	0.483
SD of dep. var. (total sample)	(0.499)	(0.499)	(0.499)

Notes: This table reports the impact of the game on respondents' decision to enroll in the PhilHealth program. The dependent variable is an indicator for whether the respondent enrolled in the PhilHealth program. Robust standard errors are given in parentheses beneath each point estimate.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table 2 presents OLS estimation results of Equation (1). Those who participated in the game in 2010 are 6.6 percentage points more likely to have enrolled in the PhilHealth scheme in 2013. The effect of the game is significant across all models in which individual- and household-level covariates are included as well. As a robustness test, I estimate an additional

probit regression model, the results of which are presented in Table F1 in Appendix F. The model estimates confirm those of the linear probability model. In a separate analysis, I estimate the impact of the game on just those participants who were invited to play the game in 2010 compared to the control group I created in 2013. However, the small sample size is restrictive in terms of being able to detect any significant effects; the point estimates of the coefficients, however, are similar, as see in Table E1 in Appendix E. Therefore, I focus on the results for the total sample of everyone who played the game in 2010.

Table 3: PhilHealth enrollment change over time for the treated

	Treatment 2010	**Treatment 2013**	**Equality of means p-value**
	(1)	**(2)**	**(3)**
PhilHealth enrollment	0.41	0.52	0.00***
	(0.49)	(0.50)	
Observations	458	458	

Notes: This table reports the mean for PhilHealth enrollment in 2010 and 2013 for those who participated in the game. Column 1 gives the baseline enrollment in the PhilHealth program in 2010 and Column 2 shows enrollment in 2013. Standard deviations are reported in parentheses. The *p*-values of a *t*-test are reported in Column 3.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table 3 shows the change in PhilHealth enrollment from 2010 to 2013. There is a significant increase in the proportion of the treatment group enrolled in PhilHealth in 2013 compared to 2010.

Table 4: Impact of game on Sponsored Program enrollment

Independent variables	(1)	(2)	(3)
	OLS	OLS	OLS
	Panel A: Average treatment effects		
Game	0.085***	0.075**	0.071**
	(0.031)	(0.032)	(0.031)
Intercept	0.351***	0.319***	0.136
	(0.020)	(0.117)	(0.129)
	Panel B: Control variables		
Individual controls		Yes	Yes
Household controls			Yes
	Panel C: Model		
Observations	1,033	1,033	1,033
R^2 adj.	0.002	0.011	0.032
Mean of dep. var. (total sample)	0.389	0.389	0.389
SD of dep. var. (total sample)	(0.488)	(0.488)	(0.488)

Notes: The dependent variable is an indicator for whether the respondent enrolled in PhilHealth's Sponsored Program. A linear probability model is used. Robust standard errors are given in parentheses beneath each point estimate.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Next, considering the game's impact on enrollment in the Sponsored Program, I find that those who participated in the game in 2010 are 8.5 percentage points more likely to have enrolled than those in the control group, as shown in Table 4. The effect of the game is also significant across all models in which individual- and household-level covariates are included. The results from a probit regression model (see Table F2 in Appendix F) confirm those of the linear probability model.

B. Channels of game impact

As the game's impact on PhilHealth enrollment is significant, I explore the possible channels through which this impact might occur. Based on previous literature, I consider the impact of the game[12] on insurance knowledge; insurance, trust, and risk attitudes; and perceived probability of future disasters in Table 5.

Insurance knowledge

In evaluating the channels, I first consider the impact of the insurance game on insurance knowledge. Insurance knowledge is measured by asking three questions related to payouts from health insurance in case of health shocks, adapted from Cole et al. (2013), who measure insurance knowledge in the case of rainfall insurance. The first question is: "Suppose you buy health insurance that costs 500 Pesos for one year and covers medical bills up to 1500 Pesos. If you do not fall sick this year, will the insurance give you back your money that you used to buy insurance?" The second question is: "If you fall sick and your medical bills are worth 1400 Pesos, will the insurance company cover any amount of your medical bills?" And the third question is: "If you fall sick and your medical bills are worth 1800 Pesos, how much of the medical bills will the insurance company cover?" The results for the three knowledge items are reported in Panel A of Table 5. The coefficients of the game treatment are small, mostly negative, and insignificant. The results from previous studies are mixed: Tower and McGuiness (2011) find that financial literacy seems to increase knowledge of insurance products; however, Olapade and Frölich (2012) and Cai and Song (2015) find no impact from insurance literacy on insurance knowledge, which is in line with results from this study. The results are in line with Olapade and Frölich (2012) and Cai and Song (2015), who also find no impact of insurance literacy on insurance knowledge. The questions to test insurance knowledge required some computations, which might have made it hard for participants to answer them correctly. Future studies could look at more basic insurance knowledge questions to test whether experimental games impact basic knowledge.

[12] For all the analyses, I also include the impact of the hypothetical shocks administered during the game on the different outcomes; however, none of the effects are significant. This is to be expected as the game was played three years previously; moreover, the shocks in the game were not framed such that respondents were free to give the shocks an individual-specific interpretation.

Table 5: Impact of game on other outcomes

Panel A: Dependent variable = insurance knowledge						
	Knowledge 1 (yes/no)		Knowledge 2 (yes/no)		Knowledge 3 (yes/no)	
Independent variables	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS
Game	-0.025	-0.012	-0.026	-0.033	0.000	-0.001
	(0.022)	(0.023)	(0.022)	(0.022)	(0.013)	(0.013)
Intercept	0.165***	0.443***	0.157	0.202*	0.043***	0.016
	(0.016)	(0.112)	(0.015)	(0.107)	(0.009)	(0.070)
Individual controls		Yes		Yes		Yes
Household controls		Yes		Yes		Yes
R^2 adj.	0.000	0.007	0.000	-0.002	-0.001	-0.002
Mean of dep. var. (total sample)	0.154	0.154	0.145	0.145	0.044	0.044
SD of dep. var. (total sample)	(0.361)	(0.361)	(0.352)	(0.352)	(.204)	(.204)
Panel B: Dependent variable = insurance attitude						
	Attitude (out of 21)					
Game	0.299	0.373				
	(0.260)	(0.265)				
Intercept	16.221***	16.411***				
	(0.179)	(1.072)				
Individual controls		Yes				
Household controls		Yes				
R^2 adj.	-0.001	0.011				
Mean of dep. var. (total sample)	16.353	16.353				
SD of dep. var. (total sample)	(4.179)	(4.179)				
Panel C: Dependent variable = trust						
	Trust (out of 21)					
Game	0.303	0.418				
	(0.277)	(0.281)				
Intercept	15.082***	15.366***				
	(0.189)	(1.124)				
Individual controls		Yes				
Household controls		Yes				
R^2 adj.	0.000	0.022				
Mean of dep. var. (total sample)	15.216	15.216				
SD of dep. var. (total sample)	(4.443)	(4.443)				

Note: Table 5 to be continued.

Panel D: Dependent variable = risk attitudes						
	Risk 1 (out of 6)		Risk 2 (out of 21)			
Game	0.282**	0.288*	0.549**	0.213		
	(0.113)	(0.116)	(0.252)	(0.259)		
Intercept	3.456***	4.336***	16.603***	14.925***		
	(0.077)	(0.502)	(0.174)	(1.003)		
Individual controls		Yes		Yes		
Household controls		Yes		Yes		
R^2 adj.	0.003	0.006	0.002	0.044		
Mean of dep. var. (total sample)	3.580	3.580	16.847	16.847		
SD of dep. var. (total sample)	(.057)	(.057)	(4.065)	(4.065)		
Panel E: Dependent variable = perceived probability of future disasters						
	Probability 1 (out of 10)		Probability 2 (out of 10)			
Game	0.108	0.154	0.216	0.206		
	(0.191)	(0.195)	(0.176)	(0.176)		
Constant	3.960***	3.486***	2.581***	2.341***		
	(0.126)	(0.830)	(0.116)	(0.710)		
Individual controls		Yes		Yes		
Household controls		Yes		Yes		
R^2 adj.	-0.001	0.028	-0.001	0.026		
Mean of dep. var. (total sample)	4.008	4.008	2.677	2.677		
SD of dep. var. (total sample)	(3.046)	(3.046)	(2.804)	(2.804)		
Observations	1,033	1,033	1,033	1,033	1,033	1,033

Notes: In Panel A, the dependent variables are indicators for whether the respondent correctly answered the insurance knowledge questions. In Panel B, the dependent variable is a measure of the respondent's perceived protection from insurance as measured by a three-item questionnaire with a seven-point scale. In Panel C, the dependent variable is a measure of trust based on a four-item questionnaire with a seven-point scale. In Panel D, the dependent variables are measures of risk attitude where Risk 1 is measured by a Binswanger-type lottery and Risk 2 by a three-item questionnaire with a seven-point scale. In Panel E, the dependent variables are measures of perceived probability of future property and health disasters. Robust standard errors are given in parentheses beneath each point estimate.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Insurance attitude

Next, I consider the impact of the insurance game on insurance attitudes, particularly on insurance as a form of protection. Carpena et al. (2011) and Olapade and Frölich (2012) both note that while education might not have an immediate impact on knowledge, it might impact attitudes towards financial products more easily because many financial choices involve calculations and comparisons of costs and benefits, which can be difficult for individuals with low levels of education. To estimate attitudes toward insurance, I look at the extent to which respondents view insurance as a form of protection. More specifically, perception of insurance as a form of protection is measured via a three-item questionnaire with a seven-point scale, as in Bosmans and Baumgartner (2005). The three items are: (1) An insurance policy can prevent problems; (2) With an insurance policy, I obtain a sense of security; and (3) An insurance policy is able to protect me. The coefficient of the game treatment for

attitude toward protection is insignificant. Including individual- and household-level covariates does not change the significance of the coefficients. This is in contrast to the finding of Carpena et al. (2011) and Olapade and Frölich (2012); this could be because if attitudes are more easily changed, then spillovers between the treated and the control groups could attenuate any impact of the game.

Trust

To measure trust, I look at trust in insurance providers. Trust in insurance is measured via a three-item questionnaire with a seven-point scale taken from Bruner et al. (2005). The three items are: (1) Insurance companies can be trusted; (2) Insurance companies are honest and truthful; and (3) I have great confidence in insurance companies. Panel C of Table 5 shows that the coefficients of the game treatment for trust are insignificant. The results do not change with the inclusion of individual- and household-level covariates. Thus, there is no evidence that the game treatment leads to increased trust in insurance. The results are in contrast to Patt et al. (2009) who examine the role of experimental games in establishing and building trust. They argue qualitatively that insurance games are not only a way to gauge interest in the product, but also are valuable for building trust. However, they only suggest that games might improve trust but provide no empirical evidence in support of this idea. Testing quantitatively, I find no impact of the game on trust in insurance providers.

Risk attitudes

In line with Cai and Song (2015), I consider the insurance game's impact on participants' risk attitudes. A variety of methodologies, ranging from simple to complex, are available to assess risk attitudes and choosing which methodology to employ depends on the study sample (Charness et al., 2013). In this study, I use both experimentally elicited risk preferences as well as a simpler method utilizing a questionnaire. For the first method, risk attitudes are elicited using a Binswanger-type (1980) lottery where participants are asked to choose between six lotteries (see Figure H1 in Appendix H) that vary in risk and expected return, as shown in Table H1 (see Appendix H). A second measure of risk attitudes, based on a three-item questionnaire with a seven-point scale, was also employed (Quintal et al., 2006). The three items are: (1) I avoid risky things; (2) I only make a decision when I think I can predict the outcomes; and (3) I would rather be safe than sorry.

The results from the first measure indicate that participating in the game leads to an increase in risk aversion of 0.28 points. Results from the second measure indicate that participating in the game leads to a 0.5-point increase in the risk aversion score; however, when individual- and household-level covariates are included, the significance of the second risk measure disappears.

Previous studies show that risk attitudes are not stable and that they change over time (Andersen et al., 2008). Moreover, several studies show that unfavorable shocks tend to increase risk aversion (Gloede et al., 2012; Cameron and Shah, 2015). If people are more aware of shocks either because of participating in the game or because they have enrolled in an insurance plan, then it is likely that, over time, we might see an increase in risk aversion for those who participated in the game. Although the results suggest that the game treatment leads to increased risk aversion, it is not possible to disentangle whether this effect is purely due to playing the game or stems from enrolling in insurance after playing the game. Hence the results from this analysis need to be viewed with some caution.

Perceived probability of disasters

To assess perceptions of future disaster probabilities, the participants were asked two questions:[13] "What do you think is the probability of a disaster that leads to severe loss of property next year?" and "What do you think is the probability of a disaster that leads to at least one member of the family falling severely ill next year?" In line with Cai and Song (2015), to make the concept of probability more understandable to the respondents, a simple exercise involving 10 balls, each representing a 10% probability, was employed: participants chose the number of balls they thought represented the disaster probability. The coefficients of the game treatment for perceived probability of future disasters are insignificant. The results do not change with the inclusion of individual- and household-level covariates. Thus, there is no evidence that the game treatment leads to an increase in perceived probability of future disasters. This is in line with Cai and Song (2015), who also find that the game has no impact on perceived probability of future disasters.

C. Heterogeneity of treatment effect

I next test the heterogeneity of the treatment effect to see whether the magnitude of the game effect varies across different socioeconomic characteristics, such as gender, marital status, age, education, and income. Previous research indicates that gender, age, education, income, and availability of risk-sharing alternatives, which might be higher for married couples given that they can jointly face any risk, are relevant for insurance demand and take-up (Eling et al., 2014).

Table 6 investigates the possible heterogeneous response to the game. Columns 1 and 2 report results of game effects for females and those less than 40 years of age, respectively. Column 3

[13] Cai and Song (2015) ask the following question: "What do you think is the probability of a disaster that leads to a more than 30 percent yield loss next year?" As the sample in this paper is not solely comprised of farmers, the question on yield loss would not have been appropriate for all; hence, I modified the question to be more general.

shows the results of game effects for those who are married, Column 4 for those who have less than 10 years of schooling, and Column 5 for those who have annual household income of less than the average national annual household income of 69,000 Pesos for the poorest decile (NSO, 2012). The results show that individuals from poorer households are less likely to benefit from the game. Although poorer households and individuals are more likely to be negatively affected by any shock, they might also have less means to invest in insurance, thus preventing them from benefiting from the game. There are no significant differences in game effects by gender, marital status, or education. The results are robust to the inclusion of covariates, as shown in Table G1 in Appendix G. The coefficient and the level of significance for the interaction term with income do not change; coefficients for other terms change slightly but the levels of significance do not.

Table 6: Heterogeneous response to treatment by socioeconomic characteristics

Independent variables	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS
	Panel A: Heterogeneity of treatment effects				
Game	0.045	-0.014	0.108**	0.152***	0.085**
	(0.055)	(0.066)	(0.039)	(0.044)	(0.040)
Female	-0.091**				
	(0.043)				
Game*female	0.063				
	(0.066)				
Married		0.030			
		(0.048)			
Game*married		0.121			
		(0.074)			
Education (<10 years)			0.081*		
			(0.042)		
Game*education (<10 years)			-0.064		
			(0.063)		
Income (<69,000 Pesos)				0.106***	
				(0.040)	
Game* income (<69,000 Pesos)				-0.126**	
				(0.061)	
Age (<40 years)					-0.078*
					(0.040)
Game*age (<40 years)					-0.025
					(0.062)
Intercept	0.411***	0.328***	0.321***	0.295***	0.387***
	(0.035)	(0.043)	(0.025)	(0.028)	(0.028))
	Panel B: Model				
Observations	1,033	1,033	1,033	1,033	1,033
R^2 adj.	0.009	0.006	0.005	0.009	0.008

Notes: This table reports the heterogeneous effects of participating in the game on respondents' decision to enroll in PhilHealth's Sponsored Program. The dependent variable is an indicator for whether the respondent enrolled in PhilHealth's Sponsored Program. A linear probability model is used. Column 1 includes the main effect and interaction term for female respondents; Column 2 for respondents who are under the age of 40 years; Column 3 for married respondents; Column 4 for respondents who have not completed 10 years of schooling; and Column 5 for those who earn less than 69,000 Pesos annually, which is the average national income. Robust standard errors are given in parentheses beneath each point estimate.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

IV. Behavioral explanations

The field of behavioral economics sheds some light on why we might see an impact of the game on real-life enrollment. Two insights from this field are particularly relevant in the context of games and decision-making.

The role of emotions in financial decisions

As Patt et al. (2009) note, there is significant evidence linking remembered, experienced, and anticipated emotions with the decision-making process. Hence, it is likely that insurance games that allow participants to experience shocks and insurance coverage, albeit in a hypothetical setting, might affect decision-making processes just by triggering some emotions, which, unfortunately, cannot be measured in this study. Moreover, simply participating in the game might make one more open to enrolling in insurance, especially when it is offered for free. In the absence of financial barriers, those who participate in financial literacy programs may be more likely to take-up insurance when they are offered the opportunity to enroll. Unfortunately, it is not possible to test this possible channel of personality change after playing the game, but it could explain how games affect enrollment in fully subsidized insurance schemes.

Nudging

A second theoretical insight comes from the work of O'Donoghue and Rabin (1999), who argue that while conventional economic models assume exponential discounting, that is, a person's relative preference for well-being at an earlier date over a later date is the same, a more accurate model is one that adopts hyperbolic discounting, that is, people put more weight on the present than on the future (Currie, 2006). In the case of enrolling in social programs where the costs are upfront, be these monetary costs or transaction costs arising from putting together necessary documents, waiting in line, and so forth, and the benefits are in the future, the model provides useful insight (Currie, 2006). A person with time-inconsistent preferences thus might put off enrolling in a public health insurance program where the benefit might not even be needed until a future health shock occurs (Currie, 2006). To the extent that insurance games act as "nudges" that is, behavioral policy interventions that help people help themselves (Thaler and Sunstein, 2008; Baicker et al., 2012), participating in games might give people the push they need to overcome procrastinating.

V. Conclusion

This paper contributes to the understanding of how field experiments influence real-life financial decisions. Lab-in-the-field experiments can be useful learning tools by not only

providing information, but also allowing participants to experience the financial products. Insurance games as a type of financial literacy tool have the potential to increase participants' familiarity with insurance, hence leading to higher acceptance of insurance. While previous studies find a significant positive effect of insurance games on insurance take-up rates, the results are based on offering insurance choice within the experiment and might be applicable only in the short term. This study investigates the long-term impact on decision-making of participating in lab-in-the-field experiments. Moreover, I consider possible channels though which games might impact take-up rates, namely, insurance knowledge and attitudes. Future research looking at *utilization* of PhilHealth's services, instead of enrollment only, could provide a deeper understanding of the impact of such games. Such an analysis might also be useful for the design of financial literacy initiatives aimed at introducing the poor to insurance solutions.

Considering that enrollment in social health insurance schemes in many low- and middle-income countries remain dismally low, understanding barriers to insurance enrollment remains a significant task. The results of this analysis provide suggestive evidence of how insurance games directly and indirectly influence insurance enrollment. Studies on financial literacy programs suggest that there is significant scope for improvement. While in terms of cost-effectiveness, insurance games might fall in the higher end of financial costs spectrum, integrating such games into already existing financial literacy training programs might prove to be more feasible. The results here will thus be useful to insurers and policymakers engaged in using such programs to make insurance more familiar and understandable to the rural poor.

A major challenge in studying the impact of financial literacy programs is designing the programs to be studied: What should they include? How long should they be? How should they be taught? The impact of financial literacy training program depends not only on the structure of the program itself, but also on the population to which it will be offered. Moreover, there is no fixed definition of what financial literacy training means, as it can vary from one-day consultation sessions in the field to extensive in-class training over a period of one to two years. This variability in programs makes it difficult to discover which features are most effective. This study enhances our understanding of what kinds of programs might be most useful to participants who have low levels of education and income.

Another important lesson from this study is that, as researchers, we can have a significant impact on our subjects, whether this is intended or not. With the growth of field experiments, this is an important aspect to keep in mind. While the main objective of the insurance game played in 2010 was to assess subjects' social behavior in light of insurance availability, the game had further consequences for the participants in the form of actual enrollment in

insurance. This might be desirable in cases where the objective is to encourage enrollment so as to benefit the target population; however, in cases where insurance providers cannot be trusted, such an outcome would be less than desirable.

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Appendix

Appendix A Questionnaire items measuring math, probability and numeracy skills

Table A1: Questions for measuring math, probability, and numeracy skills

Panel A: Math skills[14] (8 questions)
How much is 4 + 3?
If you have 20 Pesos and a friend gives you 50 Pesos, how many Pesos do you have?
How much is 35 + 82?
If you have 48 Pesos and someone gives you 58 Pesos, how much money do you have?
What is 3 times 6?
If you have four friends and would like to give each one four sweets, how many sweets must you have to give away?
What is 10% of 400?
Suppose you want to buy food that costs 37 Pesos. You only have one 100 Pesos note. How much change will you get?
Panel B: Probability skills[15] (2 questions)
If the chance of getting a disease is 10%, how many people would be expected to get the disease out of 1,000?
If the chance of getting a disease is 20 out of 100, this would be the same as having a ____% chance of getting the disease.
Panel C: Numeracy skills[16] (3 questions)
Imagine that we flip a fair coin 1,000 times. What is your best guess about how many times the coin would come up heads in 1,000 flips? In a lottery, the chances of winning a 500 Pesos prize are 1%. What is your best guess about how many people would win a 500 Pesos prize if 1,000 people each buy a single ticket to the lottery? In another lottery, the chance of winning a car is 20 in 1,000. What percent of lottery tickets win a car?

[14] See Cole et al. (2013).
[15] See Weller et al. (2013).
[16] See Schwartz et al. (1997).

Appendix B Summary statistics and balance check for invited and peer groups

Table B1: Summary statistics and balance check for invited and peer groups

	Sample mean (1)	Peer group (2)	Invited group (3)	Equality of means *p*-value (4)
		Panel A: Household characteristics		
Household size	5.13	5.19	5.01	0.37
	(2.15)	(2.16)	(2.14)	
Log of household income (annual) (in Pesos)	7.90	7.88	7.94	0.33
	(0.68)	(0.67)	(0.71)	
Household has savings (1=yes)	0.22	0.23	0.21	0.59
	(0.42)	(0.42)	(0.41)	
Skipped meals in the past 3 months (1=yes)	0.28	0.29	0.27	0.60
	(0.45)	(0.45)	(0.44)	
Land size (in hectares)	0.16	0.15	0.19	0.51
	(0.66)	(0.73)	(0.50)	
Own livestock (1=yes)	0.32	0.32	0.30	0.54
	(0.47)	(0.47)	(0.46)	
		Panel B: Individual characteristics		
Female	0.69	0.74	0.60	0.00***
	(0.46)	(0.44)	(0.49)	
Married	0.81	0.81	0.80	0.89
	(0.40)	(0.39)	(0.40)	
Regular income (1=yes)	0.24	0.25	0.21	0.38
	(0.43)	(0.43)	(0.41)	
Age	42.95	42.02	44.87	0.01**
	(12.28)	(11.94)	(121.94)	
High school graduate (1=yes)	0.45	0.45	0.45	0.99
	(0.50)	(0.50)	(0.50)	
Number of years living in barangay	31.61	31.17	32.50	0.42
	(17.65)	(17.77)	(17.43)	
Number of church visits per month	2.61	2.62	2.60	0.91
	(1.68)	(1.69)	(1.69)	
PhilHealth enrollment (1=yes)	0.39	0.41	0.35	0.21
	(0.49)	(0.49)	(0.48)	
Health shocks in the past 3 years (1=yes)	0.72	0.72	0.72	0.99
	(0.45)	(0.45)	(0.45)	
Fire in property in the past 3 years (1=yes)	0.02	0.01	0.02	0.45
	(0.13)	(0.12)	(0.02)	
Theft of assets in the past 3 years (1=yes)	0.05	0.05	0.05	0.94
	(0.21)	(0.21)	(0.21)	
Agricultural shocks in the past 3 years (1=yes)	0.39	0.39	0.39	0.86
	(0.49)	(0.49)	(0.49)	
Number of relatives close by	4.37	4.65	3.80	0.24
	(7.60)	(8.27)	(5.97)	
Number of friends close by	9.03	9.36	8.35	0.68
	(25.45)	(29.64)	(13.10)	
Risk preference[a] (out of 10)	7.78	7.72	7.91	0.39
	(2.31)	(2.38)	(2.18)	
Happiness score[b] (out of 10)	6.99	6.93	7.11	0.33
	(1.98)	(2.00)	(1.92)	
Ladder of life score[b] (out of 10)	5.91	5.99	5.75	0.30
	(2.43)	(2.41)	(2.48)	
Observations	513	345	168	

Notes: This table reports sample means and tests for balance between the peer and the invited groups in 2010 using the information gathered from the survey questionnaire in 2010. Panels A and B give sample means for household and individual characteristics, respectively. [a]Risk preference is measured by asking how willing someone is to take risks (on a scale from -5 to 5, which is converted to a scale of 0 to 10). [b]Questions require ranking oneself on a scale from -5 to 5, which is converted to a scale of 0 to 10. Standard deviations are reported in parentheses. The *p*-values of a *t*-test are reported in Column 4.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Appendix C Attrition, shocks, coping mechanisms, and reasons for not buying insurance

Table C1: Attrition

Reasons for attrition	No. of individuals not found
Domestic migration	15
Foreign migration	13
Death	7
Not available for survey/away from barangay	7
Could not find/refused to be interviewed	13
Total observations	**55**

Table C2: Most common types of shocks

Types of shocks	Percent of affected individuals
Health	63.79
Fire	0.77
Theft of assets	2.03
Bad weather conditions affecting agriculture	39.40
Price changes for agricultural inputs	29.72
Total observations (1,033)	

Table C3: Coping mechanisms for health shocks

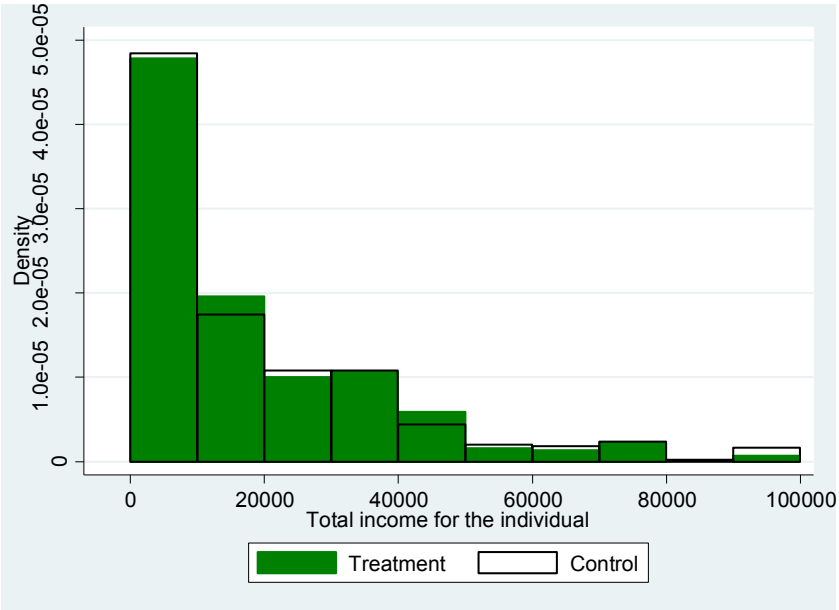
Types of coping mechanism	Percent of individuals
Own money	25.00
Borrow	63.84
Gift (village)	1.89
Gift (government/NGO)	1.73
Sell asset	3.14
Insurance	3.30
Consume less	1.10
Total observations (636)	

Table C4: Reasons for not buying insurance

Reasons for not buying insurance	Percent of individuals
Lack of money	86.01
Not available	3.82
Lack of knowledge	2.08
No trust in insurance	5.20
No time	2.54
No need for insurance	0.35
Total observations (865)	

Appendix D Comparison of income distribution in treatment and control groups

Panel 1: Distribution of annual individual income across treatment and control groups



Panel 2: Distribution of annual household income across treatment and control groups

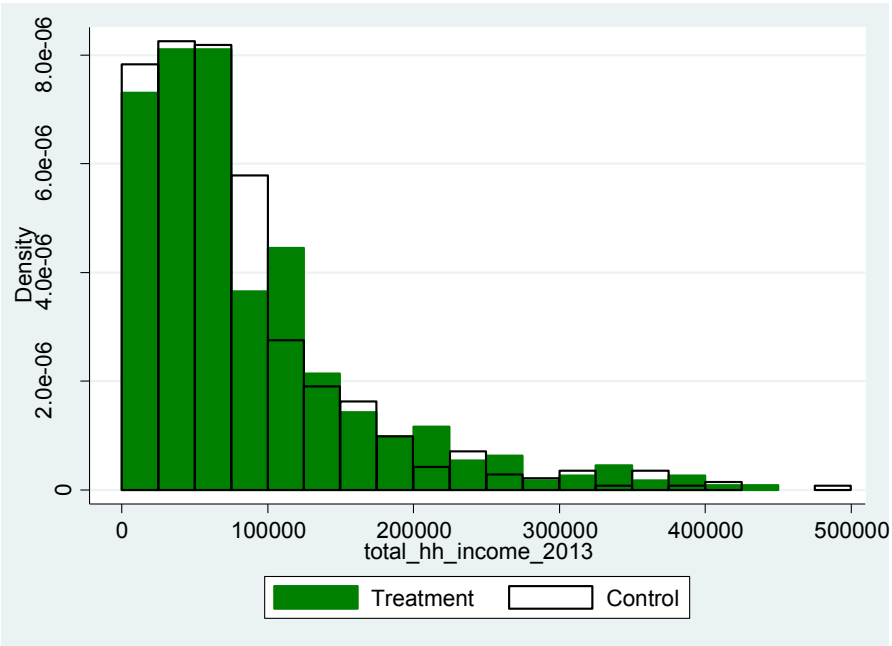


Figure D1: Distribution of income across treatment and control groups

Appendix E Treatment effects for 'invited' participants

Table E1: Impact of game on PhilHealth enrollment for 'invited' participants

Independent variables	(1) OLS	(2) OLS	(3) OLS
	Panel A: Average treatment effects		
Invited to the game	0.046	0.021	0.015
	(0.046)	(0.047)	(0.046)
Intercept	0.454***	0.184	-0.008
	(0.021)	(0.142)	(0.153)
	Panel B: Control variables		
Individual controls		Yes	Yes
Household controls			Yes
	Panel C: Model		
Observations	723	723	723
R^2 adj.	0.000	0.012	0.032

Notes: This table reports the impact of the game for those who were invited on their decision to enroll in the PhilHealth program. The dependent variable is an indicator for whether the respondent enrolled in the PhilHealth program. Robust standard errors are given in parentheses beneath each point estimate.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Appendix F Probit estimation

Table F1: Probit estmation of game impact on PhilHealth enrollment

Independent variables	(1) Probit	(2) Probit	(3) Probit
	Panel A: Average treatment effects		
Insurance game	0.066**	0.058*	0.055*
	(0.031)	(0.032))	(0.032)
	Panel B: Control variables		
Individual controls		Yes	Yes
Household controls			Yes
Observations	*1,033*	*1,033*	*1,033*

Notes: This table reports the effect of participating in the insurance game on respondents' decision to enroll in the PhilHealth program. The dependent variable is an indicator for whether the respondent enrolled in the PhilHealth program. Robust standard errors are given in parentheses beneath each point estimate.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table F2: Probit estimation of game impact on Sponsored Program enrollment

Independent variables	(1) Probit	(2) Probit	(3) Probit
	Panel A: Average treatment effects		
Insurance game	0.085***	0.076**	0.072**
	(0.031)	(0.032)	(0.031)
	Panel B: Control variables		
Individual controls		Yes	Yes
Household controls			Yes
Observations	*1,033*	*1,033*	*1,033*

Notes: This table reports the effect of participating in the insurance game on respondents' decision to enroll in PhilHealth's Sponsored Program. The dependent variable is an indicator for whether the respondent enrolled in PhilHealth's Sponsored Program. Robust standard errors are given in parentheses beneath each point estimate.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Appendix G Heterogeneous response to treatment by socioeconomic characteristics (including control variables)

Table G1: Heterogeneous response to treatment by socioeconomic characteristics

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS
	Panel A: Heterogeneous treatment effects				
Insurance game	0.027	-0.038	0.088**	0.135***	0.093**
	(0.054)	(0.067)	(0.040)	(0.045)	(0.041)
Female	-0.065				
	(0.052)				
Game*female	0.066				
	(0.065)				
Married		0.021			
		(0.050)			
Game*married		0.135*			
		(0.074)			
Education (<10 years)			0.054		
			(0.071)		
Game*education (<10 years)			-0.044		
			(0.063)		
Income (<69,000 Pesos)				0.136***	
				(0.040)	
Game* income (<69,000 Pesos)				-0.126**	
				(0.061)	
Age (<40 years)					-0.112*
					(0.058)
Game*age (<40 years)					-0.040
					(0.063)
Intercept	0.158	0.111	0.077	0.027	0.411***
	(0.131)	(0.131)	(0.164)	(0.135)	(0.174)
	Panel B: Control variables				
Individual controls	Yes	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes	Yes
	Panel C: Model				
Observations	1,033	1,033	1,033	1,033	1,033
R^2 adj.	0.031	0.036	0.030	0.046	0.034

Appendix H Risk preferences elicitation

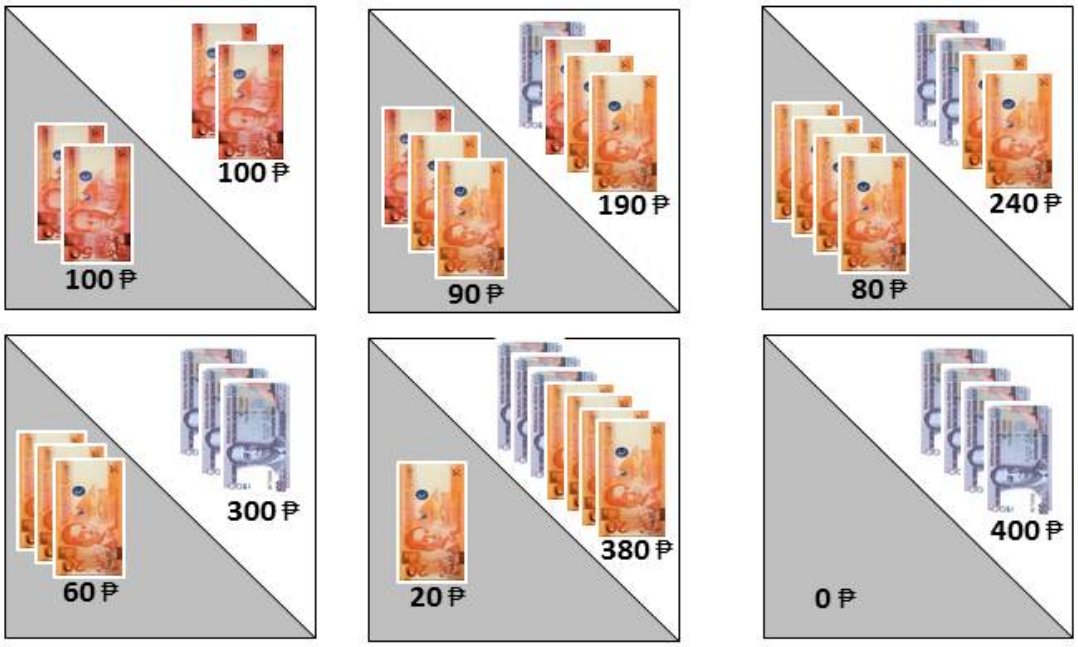


Figure H1: Binswanger (1980) lottery for eliciting risk preferences

Table H1: Binswanger (1980) lottery and estimated distribution of risk aversion

	Lottery characteristics			Parameter range of risk aversion ρ[a]	
Choice	High payoff (Pesos)	Low payoff (Pesos)	Expected value	Lower bound	Upper bound
1 (safe)	100	100	100	7.51	inf
2	190	90	140	1.74	7.51
3	240	80	160	0.81	1.74
4	300	60	180	0.32	0.81
5	380	20	200	0	0.32
6 (risky)	400	0	200	- inf	0

[a]Based on CRRA EU of the functional form $u(c) = (c^{1-\rho})/(1-\rho)$ with risk parameter $\rho > 0$ for risk-averse individuals.