Subsidy Policies and Insurance Demand*

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Abstract

Using data from a two-year pricing experiment, we study the impact of subsidy policies on weather insurance take-up. Results show that subsidies increase future insurance take-up through their influence on payout experiences. Exploring mechanisms of the payout effect, we find that for households that randomly benefited from financial education, receiving a payout provides a one-time learning experience that improves take-up permanently. In contrast, households with poor insurance knowledge continuously update take-up decisions based on recent experiences with disasters and payouts. Combining subsidy policies with financial education can thus be effective in promoting long-run insurance adoption.

Keywords: Subsidy, Insurance, Take-up, Experience, Learning

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I Introduction

Households face different types of risks that can generate large fluctuations in income and consumption. To shield individuals from risks, many governments exercise great efforts on developing and marketing formal insurance products. However, in both developing and developed countries, the value placed by individuals on insurance is usually surprisingly low,[1] and initiatives to provide information, subsidies, and to increase trust have had limited success (Cole et al. (2013), Banerjee et al. (2019)). Many countries have given up on trying to sell insurance and moved to make insurance mandatory.[2]

One reason of why learning about insurance is difficult is that "positive" experience with insurance only happens when there is a negative shock, which is rare. Moreover, the insurance literature has shown that even learning from these bad events is imperfect, as their influence diminishes over time (Cole, Stein, and Tobacman, 2014; Cai and Song, 2017).

In this paper, we study the case of a new weather insurance product for rice producing households in China. We set up a novel experiment where we jointly introduce two interventions: a subsidy policy to encourage early adoption and personal experience, and a financial education program on how insurance works. We trace subsequent adoption after two and four years to measure the long-term impacts of the two policies, their interactions, and mechanisms. We show that indeed only positive experience with insurance (receiving payouts) increases demand, and that in general this effect does not persist over time. It is only when people also receive education about insurance that they process the positive signal which influences their take-up permanently.

We start with a theoretical framework in which we specify three recognized

[1] Finkelstein, Hendren, and Luttmer (2019) show that the willingness to pay for Medicaid among low-income uninsured adults in the U.S. is only between 0.5 and 1.2 dollars per dollar of the resource cost of providing Medicaid, itself only 40% of Medicaid's total cost. Cole et al. (2013) find an adoption rate of only 5%-10% for weather index insurance policy in two regions of India in 2006. Higher take-up of weather insurance at market prices was observed in Ghana, but only following a year of extensive payouts (Karlan et al., 2014).

[2] For example, universal and free crop insurance has been provided to smallholder farmers in Mexico since 2003 under the CADENA program. In India, the Weather-Based Crop Insurance Scheme offered by the government mandates all farmers that take commercial bank loans for specified crops in preselected locations to buy insurance.

channels through which an initial exposure to insurance can affect long-term insurance demand: (1) the direct effect of experiencing payout, with an expected positive effect on take-up if there has been an insured shock and a payout has been received, and a negative discouragement effect if a premium has been paid and either no shock occurred or a shock occurred without a corresponding payout, (2) the social effect of observing network payout experiences, which follows the same process of positive and negative effects in relation to stochastic payouts, and (3) a habit forming effect, with past use of the product influencing current demand.[3] We model how these channels would be impacted by subsidies through three separate effects: (1) a scope effect where subsidies enhance take-up and hence the opportunity of experiencing or witnessing payouts, (2) an attention effect where a lower insurance cost for the individual leads to less attention being given to information generated by payout experiences, and (3) a price anchoring effect, where low past prices reduce current willingness to pay (Fischer et al., 2019).

We then estimate the impact of subsidy policies on insurance take-up using a two-year randomized field experiment, which includes 134 villages with about 3,500 households in rural China. In the first year, we randomized subsidy policies at the village level by offering either a partial subsidy of 70% of the actuarially fair price or a full subsidy. We also offered a financial education program about insurance products to randomly selected households in 86 randomly selected villages, out of the 134 sample villages. In the second year, we randomly assigned eight prices to the product at the household level, with subsidies ranging from 40% to 90%.

Reduced form results show that households receiving a full subsidy in the first year exhibit greater demand for insurance in the second year, but that the price elasticity of demand is not statistically different compared to that of households receiving a partial subsidy. Since insurance is an experience good, the effectiveness of subsidy policies may depend crucially on farmers' experience with the product. We then explore the impact of an important element of farmers' ex-

[3]The influence of own and network payout experiences have been identified by Cole, Stein, and Tobacman (2014), Gallagher (2014), and Karlan et al. (2014). Persistence in adoption has been shown for insurance by Hill, Robles, and Ceballos (2016), and for agricultural inputs by Carter, Laajaj, and Yang (2019).

perience with the insurance program - whether they received a payout (direct effect) or observed friends receiving payouts (social effect), on future insurance adoption. We show that, first, directly receiving a payout has a positive effect on second year take-up, and makes insurance demand less price elastic. This effect is stronger for households that paid for insurance. To explain why the payout effect is smaller under the full subsidy policy, we show that people paid less attention to the payout information if they received the insurance for free. Second, for those not insured in the first year, we find that observing payouts in their network increases their second-year demand. Lastly, we find no evidence of price anchoring or habit formation. Together these results suggest that the impact of the subsidies on insurance take-up comes through its potential of increasing the opportunity to receive or observe payouts, although with a trade-off in that the payout effect itself is lower when the insurance was received for free.

Turning to the long-term effect of observing payouts, with four years of insurance take-up and payout data, we show that there is heterogeneity depending on farmers' initial level of financial literacy. Specifically, for randomly selected households that benefited from financial education in the first year, receiving a payout provides a one-time learning effect which influences their take-up permanently. For them, experience of payouts reinforces their understanding of how insurance works and its benefits. In contrast, for households that did not benefit from financial education, such learning does not occur. They update insurance take-up decisions yearly based on recent changes in experience with disasters and returns of purchasing insurance. In that case, subsidies would need to be continuously provided to maintain a good overall take-up rate if no disaster happened. The policy implication is that to make subsidy policies effective in sustaining insurance adoption over time, it has to be combined with other interventions such as financial education to improve farmers' initial insurance knowledge, so that they have better capacity to learn from experiences with the product.

The long-term effects also speak to the mechanisms of the payout effect: for households that participated in the first year financial education, the real experience of payouts reinforced their understanding of insurance concepts and as a result improved voluntary take-up permanently; for those that did not participate, the main factor driving the short-run payout effect is changes in experience with disasters and returns of purchasing insurance. We also use additional tests to rule out that the payout effect comes from changes in risk attitudes and perceived probability of disasters, from improved trust on the insurance company, or from a liquidity effect.

Our work builds on and contributes to three main literatures. First, our study provides insights on the observed slow diffusion of new technologies and financial products (Bridle et al., 2018). In the case of insurance products, existing research has analyzed factors influencing take-up such as liquidity constraints, lack of financial literacy, present bias, and lack of trust in the insurance provider (Giné, Townsend, and Vickery, 2008; Gaurav, Cole, and Tobacman, 2011; Cole et al., 2013; Cai, de Janvry, and Sadoulet, 2015; Casaburi and Willis, 2018; Banerjee et al., 2019). However, even when these barriers are removed in experimental settings, insurance take-up remains low (Bridle et al., 2018). Our detailed analysis of the payout effects suggests that it is the stochastic nature of payouts and the low level of financial literacy among farmers that make them unable to learn about the insurance benefits and contribute to the low take-up.

Second, this paper sheds light on the impact and design of subsidy policies. A number of studies have examined the impact of subsidies on the take-up of products where product experience is non-stochastic. For example, Dupas (2014) finds that a one-time subsidy on insecticide-treated bednets has a positive effect on long-term take-up, which is mainly driven by a positive learning effect. In another study, Fischer et al. (2019) find suggestive evidence that positive learning can offset the negative effect of price anchoring in the long-term adoption of health products. Finally, Carter, Laajaj, and Yang (2019) find that subsidies in Mozambique induce long-term persistence in the demand for fertilizer and improved seeds, which they attribute to both direct and social learning effects. Our paper is among the first to study the impact of subsidies on financial product adoption and its mechanisms. More importantly, we show that for products with complex stochastic benefits such as insurance, an effective subsidy policy has to be implemented together with education programs to enhance people's capacity to learn from their personal experiences with the product.

Third, our results also contribute to the literature on the effect of personal experience on decision-making. Existing studies have shown the importance of experience on consumption and financial decisions (Kaustia and Knüpfer, 2008; Malmendier and Nagel, 2011; Haselhuhn et al., 2012; Gallagher, 2014). We not only provide evidence on the impact of personal experience on insurance take-up, but also exploit the exogenous individual-level variation in payout experiences to identify different mechanisms of the effect.

The paper proceeds as follows. In section 2, we explain the background for the insurance product in China. In section 3, we present the experimental design and discuss the data collected. In section 4, we develop a model of insurance demand. In sections 5, we give evidence on the subsidy effect and the payout experience effect. In section 6, we show the long-term effects of payout and heterogeneity by financial education. Section 7 discusses other mechanisms of the payout effect. Section 8 concludes with a discussion of policy implications.

II Background

Rice is the most important food crop in China, with nearly 50% of the country's farmers engaged in its production. In order to maintain food security and shield farmers from negative weather shocks,[4] in 2009 the Chinese government asked the People's Insurance Company of China (PICC) to design and offer the first rice production insurance policy to rural households in 31 pilot counties.[5] The program was expanded to 62 counties in 2010 and to 99 in 2011. The experiment was conducted in 2010 and 2011 in randomly selected villages included in the 2010 expansion in Jiangxi province, one of China's major rice producing areas. In these villages, rice production is the main source of income for most farmers. Given that the product was new, farmers and government officials had limited understanding of it and no previous interaction with PICC.

The product in our study is an area-yield index weather insurance that covers

[4]In the household survey, we asked farmers to identify the major risks they face in their agricultural production. Answers give weather shocks as the main risk that farmers are concerned with (71% of respondents list it as a major risk), followed by price risks (55%), labor shortages (28%), contracts (8%), and financing (5%).

[5]Before 2009, if a major natural disaster occurred, the government made payments to households whose production had been seriously hurt by the disaster. However, the level of transfer was usually far from sufficient to help affected farmers resume normal production levels.

natural disasters, including heavy rains, floods, windstorms, extremely high or low temperatures, and droughts. It differs from a weather index insurance, as the amount of payout depends on area average loss rather than a weather index. If any of these disasters occurs and leads to a 30% or more average loss in yield, farmers are eligible to receive payouts from the insurance company. The amount of the payout increases linearly with the loss rate in yield, from 60 RMB per mu for a 30% loss to a maximum payout of 200 RMB per mu for a full loss. Areas for indexing are typically fields that include the plots of 5 to 10 farmers. The average loss rate in yield is assessed by a committee composed of insurance agents and agricultural experts.[6] Since the average gross income from cultivating rice in the experimental sites is around 800 RMB per mu, and production costs around 400 RMB per mu, the insurance policy covers 25% of the average gross income or 50% of average production costs. The actuarially fair price for the policy is 12 RMB per mu, or 3% of production costs, per season.[7] The insurance company markets the insurance product in February each year, before the first season of rice cultivation in March. If a farmer decides to buy the insurance, the premium is deducted from a rice production subsidy deposited annually in January to each farmer's bank account, with no cash payment needed, removing any potential liquidity constraint problem, as identified for example by Giné, Townsend, and Vickery (2008) and Cole et al. (2013) in India.[8] Insurance payouts are also directly deposited to the same bank account.

Like with any area-yield index insurance product, it is possible that insured farmers may collude. However, the moral hazard problem should not be large here as the maximum payout (200 RMB/mu) is much lower than the expected profit (800 RMB/mu), and the product does require natural disasters to happen

[6] One concern of the contract design is that good farmers might have less incentive to purchase insurance as the payout is based on the fields average. We estimated the impact of baseline yield on take-up but did not find a significant effect.

[7] 1 RMB = 0.15 USD; 1 mu = 0.165 acre. Farmers produce two or three seasons of rice each year. The product was priced based on the county-level historical rice yield data collected yearly by the agricultural department. The premium is designed to cover the expected payouts and transaction costs associated with the product.

[8] Starting in 2004, the Chinese government provided production subsidies to rice farmers in order to increase production incentives.

in order to trigger payouts.[9]

III Experimental Design and Data

III.a Experimental Design

The experimental site consists in 134 randomly selected villages in Jiangxi Province with around 3500 households. We carried out a two-year randomized experiment in Spring 2010 and 2011.

The experimental design is presented in Figure 1. The main treatment involves randomization of the subsidy level in each year of the study. In the first year, we randomized the subsidy policy at the village level, with villages stratified by their total number of households. The insurance product was first offered at 3.6 RMB/mu, i.e. with a 70% subsidy on the fair price, to all households in order to observe take-up at that price. Two days after this initial sale, households from 62 randomly selected villages were surprised with an announcement that the insurance will be offered for free to all, regardless of whether they had agreed to buy it or not at the initial price. These villages are referred to as the "free sample" and the remaining 72 villages as the "non-free sample". This design allows us to distinguish "buyers" of insurance who agree to pay the offer price of 3.6 RMB/mu from "users" of insurance that include all buyers from the non-free sample group as well as all households from the free sample group. As reported in Figure 1, the insurance take-up rate at the 3.6 RMB/mu price is similar in the two samples at around 40-43%.

Note that the first year of our study coincided with a fairly large occurrence of adverse weather events that triggered insurance payouts, with 59% of the insured receiving a payout from the insurance company.

In the second year of the study, we randomized the subsidy level from 90 to 40% of the fair price at the household level. This creates eight different price treatment subgroups. Except for the price, everything else remained the same

[9] If there were moral hazard problems, the likelihood of collusion should increase with the price paid by farmers. We tested the impact of price on the payout probability and found a small and insignificant effect.

in the insurance contract as in the first year.[10] Similar to the design in Dupas (2014), only two or three prices are assigned within each village.[11] For example, if one village is assigned a price set (1.8, 3.6, 5.4), each household in that village is randomly assigned to one of these three prices. To randomize price sets at the village level, we stratified villages by size (and first year village-level insurance payout rate). To randomize prices within the set, we stratified households by rice production area.

In both years, we offered information sessions about the insurance policy to farmers, in which we explained the insurance contract, the amount of government subsidy, the responsibility of the insurance company, the rules for loss verification, and the procedures for making payouts. Households made their insurance purchase decision immediately after the information session. In the second-year information session, we also informed farmers of the list of people in the village who were insured and of the payouts made during the first year at both the household and village levels.

Two complementary randomized treatments were implemented in the first year. First, we offered a financial education program about insurance products in 86 randomly selected villages, out of the 134 sample villages. In each of those villages, around 50% of households were randomly selected to receive the financial education in a group meeting. The insurance education includes the following main elements: (i) explanation of the difference between an insurance program and a government subsidy; (ii) information on the historical yield loss in the study region; and (iii) exercises in computing the expected benefit or loss from purchasing insurance for five continuous years depending on different disaster frequencies and levels. This last theme is extremely important because a key reason many farmers give for not buying insurance is that they resent losing money in years without a bad shock. In the training, we use concrete examples to show that insurance is a type of product that needs to be purchased continuously

[10] This two-year price randomization scheme is similar to Karlan et al. (2014). But by eliciting demand before surprising people with free offer in the first year, we can look at price effects absent of selection.

[11] Price sets with either two or three different prices are randomly assigned at the village level. For villages assigned with two prices $(P_1, P_2), P_1 <= 3.6$ and $P_2 > 3.6$; for villages with three prices $(P_1, P_2, P_3), P_1 < 3.6, P_2 \in (3.6, 4.5)$, and $P_3 > 4.5$.

to ensure that you will receive a payout in a year of disaster, and that the payout will be more than compensate all the premiums you have to pay (this is the case with this heavily subsidized product). Cai, de Janvry, and Sadoulet (2015) show that participating in these education sessions substantially improved insurance take-up and understanding of insurance.

Second, we randomized a default option at the village level. In about 40% of our sample villages, we assigned households with a default "BUY" option, meaning the farmer must sign off if he does not want to purchase the insurance. We assigned the other villages with a default "NOT BUY" option, meaning the farmer must sign on if he decides to buy the insurance. All groups otherwise received the same pitch for the product. The randomized financial education and default options will be used in some estimations as instrumental variables for the insurance purchase decisions.

One concern in the experimental design is that since farmers in free villages were surprised by a price drop in the first year of the study, they might expect a similar price change in the second year.[12] We use two tests to rule out this concern. First, in the second year survey we asked farmers the post-subsidy premium and whether they expect further price drop. We then test the impact of the first year free treatment on answers to those questions. Results in column (1) of Table A1 suggest that farmers in free villages are not more likely to expect a price drop than those in non-free villages. Second, we use a sample of households from a separate experiment in which we randomized prices at the household level in the first year.[13] In that sample, there was no intervention in the second year and everyone received a post-subsidy price of 3.6 RMB. We only keep those that were assigned with a zero price during the first year in the price experiment sample, and then compare their second year insurance take-up with those in free villages. We show in column (2) of Table A1 that being *surprised* by receiving the insurance for free in the first year does not affect decision-making in the second year. As a result, the "surprise" treatment does not distort farmers' willingness

[12]We did emphasize during the information sessions that the price is final and there won't be further price changes.

[13]The price experiment was in parallel to the experiment that we report in this paper. The experiment includes 12 villages, which were randomly selected from the population of villages exactly like the 134 sample villages used in this paper.

to pay for insurance in subsequent years.

III.b Data and Summary Statistics

The empirical analysis is based on PICC administrative data of insurance purchase and payout, and on household surveys conducted after the insurance information session each year. Since almost all households produce rice, and all rice producers were invited to the information session with a more than 90% attendance rate, this provides us with a quasi census of the population of these 134 villages, a representative sample of rice-producers in Jiangxi. In total, 3474 households were surveyed. Most of the analysis that follows refer to the two years 2010 and 2011 of the experiment for which we have both administrative and survey data. However, in section VII on mechanisms of the payout effect, we will also use administrative data on payout and take-up for the years 2012-2014 when prices were uniformly set to their base value of 3.6 RMB.

We present the summary statistics of key variables in Table 1. The data in Panel A show that household heads are almost exclusively male and cultivate on average 12 mu (0.80 ha) of rice per year. Rice production accounts on average for almost 70% of total household income. Households indicate an average risk aversion of 0.2 on a scale of zero to one (risk averse).[14] In Panel B, we summarize the payouts issued during the year following the first insurance offer. With a windstorm hitting several sample villages, 59% of all insured households received a payout in the first year of our study, with an average payout size of around 102 RMB. The payout rate was not significantly different between households in free vs. non-free villages, at 61% and 57%, respectively. For the non-free villages, this corresponds to 24% of all households. All households, regardless of whether they purchased the insurance or not, could also observe their friends' experiences. Identification of friends comes from a social network census conducted before the experiment in year one. In that survey, we asked household heads to list five close friends, either within or outside the village, with whom they most frequently

[14]Risk attitudes are elicited by asking households to choose between a certain amount with increasing values of 50, 80, 100, 120, and 150 RMB (riskless option A), and a risky gamble of (200 RMB, 0) with probability (0.5, 0.5) (risky option B). The proportion of riskless options chosen is then used as a measure of risk aversion, which ranges from 0 to 1.

discuss rice production or financial issues.[15] In the sample of non-free villages, 68% of households had at least one friend receiving a payout, while in free villages, 81% of households observed at least one of their friends receiving a payout. As a result, in villages with full subsidies, most households were able to experience the benefits of insurance by themselves, or could observe their friends' positive experiences with the product.[16] Lastly, Panel C shows that the first year take-up rate was 41% while the second year was 53%, with this increase corresponding to a 7.3 (16.3) percentage point increase in the non-free (free) villages.

To verify the free and price randomizations, we regress the seven main household baseline characteristics (gender, age, household size, household head education, area of rice production, risk aversion, and perceived probability of future disasters) on the insurance price or free intervention and a set of region dummies:[17]

$$X_{ij} = \alpha_0 + \alpha_1 Intervention_{ij} + \eta_j + \epsilon_{ij} \tag{1}$$

where X_{ij} represents household characteristics, $Intervention_{ij}$ is either the post-subsidy price in year 2 or whether the household is in a free village in year 1, and η_j indicates region fixed effect. Table 2 reports the results. All coefficient estimates are small in magnitude and none is statistically significant, confirming the validity of the two randomizations.

IV Theoretical Framework

The net utility of buying insurance is posited to be additive in perceived benefits (related to the probability of receiving a payout) and costs. Perceived benefits in

[15]About 92% of the network connections are within villages, suggesting that inter-village spillover effects should be small. For a detailed description of the network data, see Cai, de Janvry, and Sadoulet (2015).

[16]The correlation between self and network payout is about 0.33, meaning that there is substantial heterogeneity of yield loss within villages. This is because the disaster that happened in the first year was windstorms, and the yield loss depends on the very specific location of the plot.

[17]In this paper, region refers to the administrative villages, while village refers to natural villages. Administrative village is the lowest level of governance in China, normally composed of about 10 natural villages.

year t include a prior expected value EV_{t-1} which is modified as the household gets exposed to the functioning of insurance, getting more familiar with it and observing the distribution of payouts. The additional information obtained in a specific year t is a function of three factors: own experience with payouts in the previous year V_{t-1} for those insured, network experience of payouts $NetV_{t-1}$, and I_{t-1}, an indicator of whether the individual was insured the previous year. Without specifying further, we write this function as $g(V_{t-1}, NetV_{t-1}, I_{t-1})$, and the perceive benefits in year t as $EV_{t-1}+\lambda g(V_{t-1}, NetV_{t-1}, I_{t-1})$, where λ controls the rate at which information from last year is taken into account. When $\lambda = 0$, there is no updating in the expected benefits from insurance experience. The higher the parameter, the more responsive individuals are to recent realizations. The model can thus capture a variety of updating rules, including a full-information Bayesian updating where the weight given to last year corresponds to the new statistical information embedded in it, but also a "recency bias" where more recent events are disproportionally weighted. We further specify λ to be a function of the price paid for the insurance: $\lambda_t = \lambda(p_{t-1})$. In this way, our model is similar to a Bayesian learning model that allows for incomplete information or poor recall related to past events as considered by Gallagher (2014). However, in our model, a belief is updated regarding the value of the insurance, as it is really the payout experience and not the weather event that influences subsequent take-up decisions, as we will see later.

The cost of insurance includes three terms: the price at which the insurance is offered p_t, a gain-loss in utility which we assume to be a linear function of the difference between the offered price and a reference price, $\gamma(p_t - p_{rt})$, and a transaction cost δ_t. Transaction costs are assumed to depend on past experience, i.e., $\delta_t = \delta(I_{t-1})$. Adding a preference shock ϵ_t, the overall utility of purchasing insurance for an individual then becomes:

$$(2)\quad W_t - \epsilon_t \equiv EV_{t-1} + \lambda_t g(V_{t-1}, NetV_{t-1}, I_{t-1}) + \beta p_t + \gamma\left(p_t - p_{rt}\right) I_{t-1} + \delta_t - \epsilon_t$$

In the experiment, we analyze the insurance purchase in year 2 such that:

$$Buy_2 = 1 \quad \text{if } \epsilon_2 < W_2 \equiv \alpha + \lambda(p_1) g(V_1, NetV_1, I_1) + \beta p_2 + \gamma (p_2 - p_1) I_1 + \delta(I_1)$$
$$(3) \qquad = 0 \quad \text{otherwise}$$

Recall that the insurance was first offered to all farmers at a unique price p_1^* in order to elicit their demand for insurance. Then, in a random sample of villages, farmers were "surprised" by a government decision to give out the insurance for free. The reference price that enters the second year decision, p_1, is thus either the initial price offer p_1^* or 0. This design allows us to separate the insurance purchase Buy_1 (at p_1^*) from access I_1, which also includes farmers that receive the insurance in year 1 for free after choosing not to buy it originally.

The different mechanisms that may influence the purchase of insurance in the second year are readily seen in the W_2 expression:

- *Effect of own payout experience*: This mechanism enters through the realized V_1 in expression (3), reflecting updating of information, with eventually a recency bias in demand. Neglecting any network effect, for those insured in year 1, if households experienced a payout, we expect this term to be positive and their demand to increase. In contrast, with no payout, we expect the term to be negative and insurance demand to drop, capturing a discouragement effect.

- *Effect of observing network payouts*: This mechanism is qualitatively similar as that of receiving a payout and enters through $NetV_1$ in $g(V_1, NetV_1, I_1)$.

- *Transaction costs* enter through the term $\delta(I_1)$.

The effects of first year price subsidy on second year take-up can be also identified in equation (3):

- A *scope* effect or potential for experience through its determination of I_1.

- An *attention* effect with its influence on the rate of adjustment in expectation through $\lambda(p_1)$.

- A *price anchoring* effect with the term $\gamma (p_2 - p_1)$.

V The Effect of First-Year Subsidies on Second-Year Insurance Take-up

V.a Aggregate Effect

In this section, we estimate the aggregate impact of the first year subsidy on the second year insurance demand with the following specification:

$$(4)\ \ Takeup_{ij2} = \alpha_1 Price_{ij2} + \alpha_2 Free_{ij1} + \alpha_3 Price_{ij2} * Free_{ij1} + \alpha_4 X_{ij} + \eta_j + \epsilon_{ij}$$

where $Takeup_{ij2}$ is an indicator for the purchase decision made by each household in year two, $Price_{ij2}$ is the price that a household faced in year two, $Free_{ij1}$ is an indicator for being under full subsidy in the first year, X_{ij} are baseline household characteristics including gender, age, household size, household head education, area of rice production, risk aversion, and perceived probability of future disasters,[18] and η_j are region dummies.

Results in Table 3, column (1), show that the second year take-up rate among households offered a full subsidy in the first year is higher than that of households offered a partial subsidy (by 5.97 percentage points, about a 12% increase, significant at the 10% level). Adding controls in column (2) does not affect the result, which is expected since they are orthogonal to the treatment. This suggests that offering higher subsidies does improve the level of insurance demand beyond the year it is implemented. The results in column (3) show that households with different first year subsidies do not differ in the slope of their demand curve. The slope parameter of -0.49 translates into a price elasticity of -0.44 for the price level of 3.6 RMB/mu and the corresponding take-up rate of 40%. This is lower than the [-1.04, -1.16] range for the price elasticity found in Gujarat by Cole et al. (2013), but of the same order of magnitude as that in the U.S. (in the [-.13, -.74] range, reported in O'Donoghue (2014)).

[18]The first four characteristics are pre-determined and won't be affected by any treatments. We tested the impact of the free and price randomizations on the second year area of rice production, risk aversion, and perceived probability of future disasters. The magnitude of impact is small and all effects are insignificant.

V.b Effect of Experiencing Payouts - Direct and Social Effects

From the policy-maker's perspective, the objective of providing subsides on insurance is to give more farmers the opportunity to experience the product, so that they can learn about the insurance benefits and will purchase the product even if subsidies are removed in the future. As a result, the effectiveness of subsidy policies depends crucially on farmers' experience with the product. In this section, we explore the impact of an important element of farmers' experience with the insurance program - whether they received a payout (direct efect) or observed friends receiving payouts (social effect), on longer-term insurance adoption. We also study the impact of subsidy levels on the payout experience effect. The subsidy effect can be ambiguous because on the one hand, a subsidy can increase initial take-up rates, meaning more people may receive or observe payouts; On the other hand, if a household has not paid for the insurance, less attention may be given to the payout outcomes.[19]

To explore the impact of payout experience on subsequent take-up, we first examine the effect of directly receiving a payout in the first year on second year insurance demand. To maintain sample comparability, we restrict this analysis to those households that pay for insurance (in the non-free villages) or are willing to do so (in the free villages) in the first year. Figure 2 compares the insurance demand curves for households that receive a payout to those for households that do not receive a payout. The figure shows that receiving a payout induces a higher level of renewal of the insurance contract and makes the insurance less price elastic. The corresponding estimation equation is:

(5)

$$Takeup_{ij2} = \alpha_1 Price_{ij2} + \alpha_2 Payout_{ij1} + \alpha_3 Price_{ij2} * Payout_{ij1} + \alpha_4 X_{ij} + \eta_j + \epsilon_{ij}$$

where $Payout_{ij1}$ is a dummy variable equal to one if the household received a payout in year 1.

[19] For experience-based goods, two arguments have been given for why the effect could be lower when people pay less: the "screening effect" of prices could be lower (Ashraf, Berry, and Shapiro (2010)) or people who pay more for a product may feel more obliged to use it; thus, the "sunk cost" effect is higher with lower subsidies.

We report the estimation results in Table 4. For households that received a partial subsidy in the first year (columns (1) and (2)), receiving a payout improves their second year take-up rate by 36.8 percentage points, and mitigates the subsidy removal (price) effect by around 80%.[20] To further control for any direct effect due to the severity of a weather-related loss, we use a regression discontinuity method, with the loss rate as the running variable and instrumenting payout with the 30% loss rate threshold. The results of this analysis, in column (3), show that the payout effect is still large and significant, suggesting that the weather shock event does not explain the payout effect.[21] For households that received a full subsidy in the first year (columns (4)-(6)), the magnitude of the payout effect is only about half of that observed for households that paid some amount for their insurance. The effect of a payout on the slope of the second year demand curve is similar in size but is less significant.[22]

To further characterize the payout effect, note in Figure 2 that absent a payout, there is a substantial decline in take-up rate at 3.6 RMB/mu in year 2, especially for those who paid for insurance. Demand after a payout is higher among those that paid for the insurance in the first year. Column (7) of Table 4 confirms this: in absence of payout, the demand for insurance is higher after a year of free experience than it is if households have paid some amount for their insurance. However, the opposite holds true if a payout has been received. These results suggest that providing a full subsidy mitigates payout response, with less of a decline in demand when there is no payout but also a smaller positive effect when there is a payout.

We next examine the effect of observing payouts in your network on subsequent insurance take-up. To do so, we include the network payout variable, $NetPayHigh$. This is a dummy variable that indicates whether more than half

[20]We also test the impact of the amount of payout received in the first year on second year take-up rates (Table A2). The effect pattern is similar to that indicated in Table 4.

[21]Allowing different functions on both sides of the discontinuity does not change the result.

[22]Since the insurance product is area-based, the actual loss rate that a farmer experienced could be different from the loss rate on which payout was issued. However, in our case the basis risk is low. We calculated the theoretical payout amount using the self-reported household level loss rate and compared it with the real payout amount. We found that the absolute difference is very small (mean difference is 9.3 RMB, with a standard deviation of 24.4 RMB). We also re-estimated columns (3) and (6) in Table 4 controlling for the difference between theoretical and real payouts, and results remain the same.

of the insured members within a farmer's personal network received a payout in the first year. The results in Table 5, column (1) indicate that the effect of observing payouts in your network on subsequent insurance take-up is much smaller among households that received a full subsidy.

To better understand the interaction between the direct and social effects of payouts, we look at the results for four groups separately, defined by whether households were willing to pay for the insurance or not in the first year, and whether they have received it for free. The estimation equation is as follows:

$$
\begin{aligned}
Takeup_{ij2} = &\alpha_1 Price_{ij2} + \alpha_2 NetPayHigh_{ij1} + \alpha_3 Payout_{ij1} \\
&+\alpha_4 NetPayHigh_{ij1} * Payout_{ij1} + \alpha_5 NetTakeup_{ij1} + \eta_j + \epsilon_{ij}
\end{aligned} \tag{6}
$$

where $NetTakeup_{ij1}$ is the proportion of friends in one's social network who purchased the insurance in the first year, instrumented by the share of friends receiving the financial education treatment and the average first-year default option.[23]

Column (2) of Table 5 shows that households not insured in year 1 (and hence without any direct experience) are strongly influenced by their network experience. In contrast, those that purchased the insurance or were willing to purchase it are solely affected by their own experience (columns (3) and (5)).[24] Households that would not have purchased the insurance but received it for free seem to be influenced by either own experience or their network experience with a similar degree. We also confirm in this table that the effect of one's own experience with payout is smaller when the household received the insurance for free.

This begs the question of why the payout effect is smaller when households received the insurance for free. We suggest that it is mainly driven by differences

[23]One problem of using Default as the IV is that it might influence the information that people have about the product. We tested the impact of Default on knowledge of the insurance product and the level of trust on the insurance company in year 1, attendance of the second year information session, and understanding of the first year payout outcomes. All effects are small and not significant.

[24]We use another indicator of network payouts - a dummy variable indicating whether a household has at least one friend receiving payout, for robustness check. Results are similar as reported in Table A3.

in the salience of insurance benefits. Specifically, households who paid for the insurance are more attentive to the payout outcome and thus experience a larger payout effect. To support this argument, we examine household attendance in the second year information session and their performance in a short knowledge quiz about payout outcomes.[25] Table A4 shows no significant difference in the attendance rate of the second year information session between villages with different first year subsidy policies (column (1)). However, on questions testing a household's knowledge of the payout outcomes, insurance takers in non-free villages are much more likely to answer the questions correctly compared with those who received the insurance for free (column (2)). Similarly, we show in column (3) that insurance takers in non-free villages had a higher probability of increasing investment in rice production than their counterparts in free villages.[26] These results suggest that households that received a full subsidy paid less attention to insurance outcomes, reducing the salience of payouts. They are also probably less aware of the fact that they were insured and value the product less, inducing a smaller impact of being insured on agricultural investment.

Overall, we conclude that households' experience with payouts is an important determinant of subsequent insurance take-up.[27] Providing subsidies has both positive and negative impacts on the payout effect - on the one hand, by enlarging the coverage of insurance, it increases the opportunity for farmers to either directly experience a payout or observe payouts paid to their friends; on the other

[25]The quiz includes questions testing a household's knowledge of the payout rate in their village, the average magnitude of payout amount, and who received payouts.

[26]We also report that among the non-takers, the provision of free insurance raised the probability of increasing rice production investment from 24% to 32.2%.

[27]We also tested the price anchoring and habit formation effects but both are small and insignificant. Specifically, we examine the price anchoring effect by studying the set of households that were willing to purchase the insurance at 3.6 RMB/mu in the first year and were assigned a price lower than or equal to 3.6 RMB/mu in the second year. For this group, the second year price is an increase for those that receive a full subsidy in the first year, and a decrease or no change for those that received a partial subsidy. If there was an anchoring effect, we should see a lower second-year take-up rate among households with full subsidy in the first year. Regression results in Table A5 show that the difference between those that were fully subsidized and those that were not is small and insignificant. As a result, we do not find evidence of a price anchoring effect. We rule out the habit formation effect in Table 6 - after controlling for payout experiences, whether a household is insured or not in previous years does not affect the subsequent take-up (please note that to reduce the length of the table the coefficients of previous take-up variables are not reported there).

hand, it reduces the attention paid to these payout experiences. The net of the two is in our case positive, and the second year take-up in free villages is higher than in non-free villages. Given the importance of this payout effect, we explore in the next sections its long term impact, heterogeneity, and mechanisms.

VI Long-Term Effect of Payout and Heterogeneity by Financial Education

Although receiving payouts substantially increased immediate insurance take-up, the impact can be different in the long-run. The persistence of payout effects may depend on whether receiving a payout can provide a one-time learning experience that complements or confirms what the farmer previously understood of the insurance product. If that is the case, experiencing a payout once can permanently improve future insurance take-up, and any additional payout experience would not have further impacts. On the other hand, farmers can accumulate payout experiences, possibly weighting the experiences differently over time, either with decreasing weights as a second or a third experience of payout teaches you less, or in the opposite direction with larger weights given to more recent events. To explore these possibilities, in this section we analyze the impact of receiving payouts on long-term insurance take-up using additional years of data on insurance take-up and payout.

Specifically, we examine the impact of the first three years' payout experiences on the 4th year insurance take-up, with the following estimation equation:

$$\begin{aligned} Takeup_{ij4} =& \alpha_1 Payout_{ij1} + \alpha_2 Payout_{ij2} + \alpha_3 Payout_{ij3} \\ &+ \alpha_{12} Payout_{ij1} * Payout_{ij2} + \alpha_{13} Payout_{ij1} * Payout_{ij3} \\ &+ \alpha_{23} Payout_{ij2} * Payout_{ij3} + \alpha_{123} Payout_{ij1} * Payout_{ij2} * Payout_{ij3} \\ &+ \sum_{k=1,..,3} \beta_k Insured_{ijk} + \eta_j + \epsilon_{ij} \end{aligned} \tag{7}$$

where $Takeup_{ij4}$ indicates the take-up decision in year 4. $Payout_{ijk}$ is a dummy variable equal to one if the household received a payout in year k. Households receive payouts only if they purchased insurance and experienced a yield loss greater than 30% induced by weather shocks. Since the insurance take-up decisions are endogenous, the payout variables are also endogenous. We take advantage of the randomized free intervention, default option, and second year price, which generated exogenous variations in insurance take-up, and estimate the model with 2SLS. The instruments are $Free_{ij1}$, $Default_{ij1}$, $Price_{ij2}$, and their interactions with the weather realizations $Loss_{ijk}$, $Loss_{ijk} * Loss_{ijl}$, and $Loss_{ij1} * Loss_{ij2} * Loss_{ij3}$, where $Loss_{ijk}$ is a dummy variable indicating whether the household experienced a yield loss greater than 30% in the previous year.

We perform the following tests to examine the one-time learning hypothesis:

$$\begin{cases} \alpha_2 + \alpha_{12} = 0 \\ \alpha_3 + \alpha_{13} = 0 \\ \alpha_3 + \alpha_{23} = 0 \end{cases}$$

indicating that receiving a payout in year 2 has no influence if a payout was received in year 1, and receiving a payout in year 3 has no influence if a payout was received in either year 1 or 2.

Rejection of one-time learning (in favor of a positive accumulation of experience) would indicate that farmers continuously adjust their take-up decisions according to previous years disaster and payout experiences. An interesting pattern of weights given to past experiences is where more recent payout experiences have larger influence on the take-up of insurance than older experiences, implying:

$$\alpha_3 > \alpha_2 > \alpha_1 > 0.$$

An extreme case of paying attention only to the most recent event would be characterized by:

$$\begin{cases} \alpha_1 + \alpha_{12} = 0 \\ \alpha_1 + \alpha_{13} = 0 \\ \alpha_2 + \alpha_{23} = 0 \\ \alpha_1 + \alpha_2 + \alpha_{12} + \alpha_{13} + \alpha_{23} = 0 \end{cases}$$

indicating that payouts received in any year has no influence if a payout is received later.

We report the result in Table 6. In columns (1)-(3), we look at the main effects of payouts only. In columns (4)-(6) we then include all the interaction terms in order to test the one-time learning hypothesis and the recency effect.[28]

Results reported in column (1) for the whole sample suggest that the payout effect shows a significant decaying trend as earlier payout experience has smaller impacts on long-term take-up than recent payout experience. Results in column (4) support three findings: (i) The one-time learning hypothesis is rejected (see Panel Test A). Insurance take-up does not stabilize after receiving the initial payout; (ii) however, receiving one and only one payout has a long-term effect, but with a strong decaying trend as $\alpha_3 > \alpha_2 > \alpha_1 > 0$ (Panel Test C); and (iii) there is suggestive evidence that when farmers receive more than one payout, only the most recent experience influences the current year take-up decision (Panel Test B). These results are consistent with what the literature defines as a "recency effect" (Fredrickson and Kahneman, 1993; Schreiber and Kahneman, 2000; Erev and Haruvy, 2013; Cai and Song, 2017). This literature has demonstrated that experience gained during the final moments of a lab experiment impacts subsequent evaluations, and that participants assign greater weight to the latter moments in assessing an experiment. For example, Cai and Song (2017) find that the hypothetical experience of disasters and insurance payouts obtained in insurance games significantly affects real insurance take-up, but that experience gained in the latter part of the game has a much larger impact. The recency effect can be explained by the fact that memory fades over time, leading individuals to be more likely to remember more recent experiences, so that recent experiences of disasters and payouts make disasters and returns of purchasing insurance more salient when making their current period purchase decisions.

In looking for what facilitated learning from stochastic payout events, we find a strong effect of the role of financial education. In an independent randomization

[28]The first stage estimation results are reported in Table A6. The results show a strong first stage with an overall F-statistic of 85.904, and individual F-statistics for the different equations are largely above 10. All the directly corresponding coefficients on $payout_{ijk}(*payout_{ijl})(*payout_{ijm})$, i.e., the coefficient of $loss_{ijk}(*loss_{ijl})(*loss_{ijm})$ interacted with the three interventions, are significant at the 1% level.

in year 1, we offered financial education about the insurance product to randomly selected farmers, and showed that attending[29] insurance education sessions significantly improved understanding of insurance and take-up (Cai, de Janvry, and Sadoulet, 2015). We see that the trend observed in column (1) is primarily driven by the sample of households who did not participate in the first year financial education (column (3)), while for those who received financial education, the first year payout experience has a significant impact on take-up even after three years (column (2)). Furthermore, results in column (5) suggest that for farmers who attended insurance education sessions in the first year, receiving a payout provides a one-time learning effect with no decay over the years ($\alpha_1, \alpha_2,$ and α_3 are very close and we cannot reject that they are equal). In contrast, for farmers who did not receive insurance education (column (6)), the recency effect is very strong, with the early years' payout experience playing almost no role in influencing the 4th year insurance take-up. Their first year experience is in particular completely forgotten (all the terms including payout in year 1 are jointly not significant).[30]

This heterogeneity result suggests that for households who gained a better grasp of insurance concepts in the first year through financial education, the personal experience of one payout reinforces their understanding and appreciation of the benefits of insurance and improves voluntary take-up permanently. Specifically, the most important element of the financial education in our setting was to use many concrete examples to explain that insurance is a type of product that you have to purchase repeatedly, and it is very likely that if you do so, even if disasters only happen rarely, you can get back all the premiums you paid. The personal experience of disasters and payouts could reinforce farmers' understanding of such concepts, as a result improving voluntary take-up permanently. By contrast, those who did not have a good initial understanding of insurance

[29] The attendance of financial education sessions was higher than 90%.

[30] We also tried an alternative specification which directly test the impact of weather realizations on long-run insurance take-up. Results in Table A7 show a similar pattern of effects. Specifically, columns (2) suggests that for households received financial education, earlier experience of disasters has a similar impact as recent disaster experience on long-term insurance take-up, and there is suggestive evidence that the weather effect is stronger among those who are more likely to take insurance (in free villages or with default buy in year 1, and faced lower prices in year 2). In contrast, column (3) shows that for farmers who did not receive financial education, the impact of early year disaster experience on the 4th year take-up is much smaller than that of the most recent year experience.

update their insurance take-up decision yearly based on recent experience. For them, the change in experience with disasters and returns of purchasing insurance is the main factor affecting their take-up behavior.

Our findings on the mechanisms of the payout effect have important policy implications. Providing heavy subsidies on insurance premiums can improve long-term voluntary take-up only if farmers are able to learn about the benefits of purchasing insurance through their experience with the product. We show that for farmers with poor financial literacy, such learning does not occur. Instead, they mainly rely on the recent experience with disasters to update insurance purchase decisions. As a result, to make subsidy policies effective in promoting voluntary insurance adoption over time, it has to be combined with other interventions such as financial education so that farmers have better capacity to learn from personal experiences with the product.

Although providing financial education can significantly improve the effectiveness of subsidy policies, offering such programs can be very costly. We now calculate the cost of providing partial subsidies (70%) together with a financial education program, and compare it to the cost of offering full subsidies for one year. The financial education cost is mainly composed of the salary of insurance agents and transportation cost. In our context, one insurance agent can finish education for two groups of farmers with about 20 farmers in each group in a half day, and the daily salary of insurance agents is about 200 RMB. The average transportation cost from a county branch of the insurance company to villages is about 50 RMB. Thus the financial education cost per farmer is $(200 * 0.5 + 50)/40 = 3.75$ RMB. Scaling this to the average farm size of 12 mu, this amounts to 0.31 RMB/mu. Consequently, the cost of providing financial education together with a 70% subsidy equals $0.31 + 12 * 0.7 = 8.71$ RMB/mu.

This means that the cost of providing financial education together with a 70% subsidy is much lower than that of offering full subsidy (12 RMB/mu). At the same time, the 4th year take-up rate of households who received full subsidy but no financial education in the first year was about 40%, while that of households who got 70% subsidy and financial education was significantly higher - about 48%. As a result, in our context, combining financial education with partial subsidies for one year is more cost-effective than offering full subsidies and no education in improving long-term take-up.

VII Other Mechanisms of the Payout Effect

While we shown in the last section that learning about insurance benefits is an important mechanism of the payout effect, there are other possible channels driving the effect. In this section we consider the following alternative explanations: (1) changes in risk aversion or in the perceived probability of future disasters; (2) improved trust in the insurance company; (3) a liquidity effect.

First, to test the possibility that the experience of payout increases insurance adoption because it changes participants' risk aversion or perceived probability of future disasters, we estimate the impact of receiving or observing payouts on the second year risk aversion and perceived probability of disasters. Results in Table A8 show that the impact is small and insignificant. In addition, the estimated payout effects are robust to controlling for these two household characteristics.

Second, the results can be induced by an improvement in trust in the insurance company.[31] We test and reject the trust channel as follows. We construct a trust index based on household responses to a question in the second year survey as to whether they trust the insurance company regarding loss assessment and the payout issuing process. Regressing this trust index on receiving or observing a payout shows no effect, in either non-free or free villages (Table A9). Furthermore, we find that adding the trust index in the regressions of insurance take-up in year 2 on payout does not change the payout coefficients, and the payout effect does not vary with the level of trust.

Third, farmers who received payouts might face less liquidity constraint and thus have better capacity to renew the contract. To test for this liquidity effect, we examine heterogeneity in the effect of one's own payout on take-up in year 2 by year 1 area of rice production (as a proxy for household income since it accounts for 70% of total household income). We find no significant heterogeneous effect (Table A10). This also suggests that the payout effect holds for both rich and poor families.

[31] Cole, Giné, and Vickery (2017) show that being insured improves trust in the insurance company and that this effect is larger (although not significantly) for those receiving a payout.

VIII Conclusions

Participation in formal insurance programs is surprisingly low in both developing and developed countries, and efforts to boost participation by providing information, subsidies, and increasing trust have had limited success. In this paper, we study the case of a new weather insurance product for rice-producing households in China. We set up a novel experiment where we jointly provide two interventions: a subsidy policy to encourage earlier adoption and boost personal experience, and a financial education program on how insurance works. We trace subsequent adoption after two and four years to measure the long-term impacts of the two policies, their interactions, and the mechanisms at work.

We show that updating on the value of insurance is dominated by experiencing payouts. We find a positive effect of receiving a payout on future insurance take-up, with farmers who paid for their insurance reacting more strongly than those who received their insurance for free. We further find that there is a strong discouragement effect when insurance has been paid for and there is no payout, and that this effect is attenuated by the attention effect when receiving insurance for free. We also find that observing payouts in your network has an effect on take-up for those who are uninsured. We find no evidence of price anchoring or habit formation.

Examining factors driving the payout effects, we show that there is great heterogeneity depending on farmers' initial level of financial literacy. Specifically, for households who gained insurance knowledge through a randomized first year financial education program, learning is the main mechanism: personal experience of payouts reinforced their understanding of insurance concepts, so receiving a payout even only once improves take-up permanently. By contrast, for farmers with poor insurance literacy, such learning does not occur. They update insurance take-up decisions yearly based on recent changes in experience with disasters and returns of purchasing insurance. In that case, subsidies would need to be continuously provided and adjusted to maintain a good overall take-up rate depending on the occurrence of disasters.

Our results suggest a new explanation for why learning about insurance is difficult - the stochastic nature of payouts influences the salience of disasters and insurance benefits, and low financial literacy among farmers prevents them from learning about product benefits from payout experiences. The policy implication is that in order to make a subsidy policy effective in promoting long-term voluntary insurance adoption, it has to be combined with other interventions such as financial education to improve households' initial understanding of insurance so that they have the capacity to learn from experiences with the product. This insight could be widely applied to the take-up of other products and activities that involve uncertainty and require time to experience gains or losses.

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Figure 1. Experimental Design

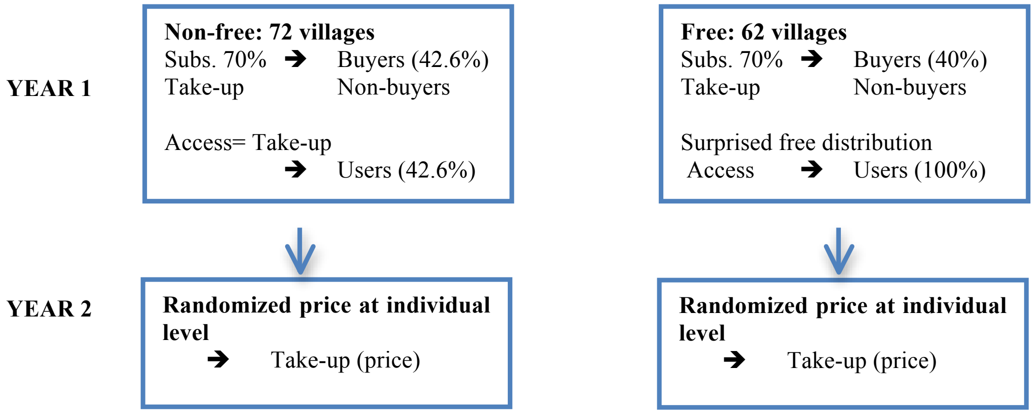

Figure 2. Effect of Own Payout on Year 2 Insurance Demand

Non-free Villages Free Villages

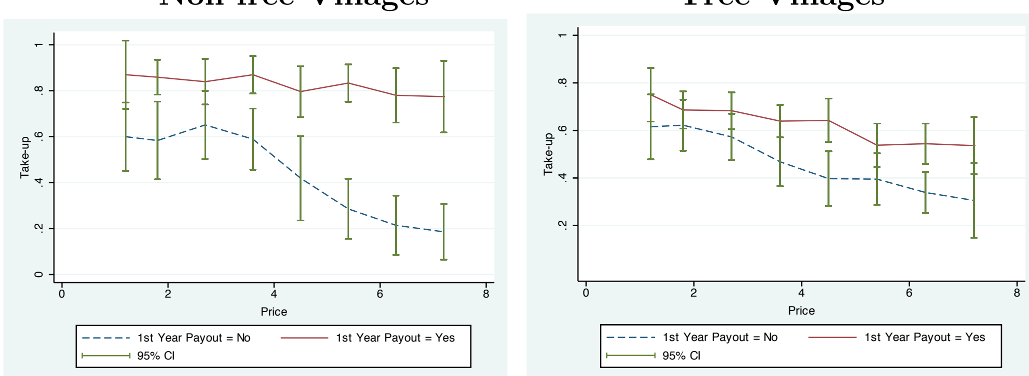

Table 1. Summary Statistics

	Sample Mean			
	All	Non-free	Free	Difference
PANEL A: HOUSEHOLD CHARACTERISTICS				
Household Head is Male	0.969	0.973	0.965	0.009
	(0.003)	(0.004)	(0.005)	(0.006)
Household Head Age	53.074	52.855	53.330	-0.475
	(0.200)	(0.268)	(0.301)	(0.401)
Household Size	5.231	5.170	5.301	-0.131
	(0.041)	(0.054)	(0.061)	(0.082)
Household Head is Literate	0.718	0.716	0.720	-0.003
	(0.008)	(0.010)	(0.011)	(0.015)
Area of Rice Production (mu)	11.774	11.962	11.556	0.405
	(0.202)	(0.294)	(0.272)	(0.405)
Share of Rice Income in Total Income (%)	69.692	68.984	70.494	-1.51
	(0.494)	(0.643)	(0.760)	(0.989)
Risk Aversion (0-1, 0 as risk loving and 1 as risk averse)	0.196	0.200	0.193	0.007
	(0.005)	(0.008)	(0.007)	(0.010)
Perceived Probability of Future Disasters (%)	33.030	32.831	33.263	-0.432
	(0.269)	(0.397)	(0.352)	(0.539)
Trust Index Year 2 (0-1)	0.602	0.595	0.610	-0.015
	(0.008)	(0.011)	(0.012)	(0.017)
PANEL B: INSURANCE PAYOUT YEAR 1				
Payout Rate (% of all households)	40.82	24.18	60.19	-36.00
	(0.83)	(0.99)	(1.22)	(1.56)
Payout Rate Among Insured (%)	58.58	56.71	60.91	-4.20
	(1.3)	(1.76)	(1.93)	(2.62)
Amount of Payout Received by Insured (RMB, per mu)	102.29	103.24	101.10	2.14
	(2.77)	(3.80)	(4.05)	(5.58)
Having at Least One Friend Receiving Payout (1 = Yes, 0 = No)	0.74	0.68	0.81	-0.13
	(0.01)	(0.01)	(0.01)	(0.015)
% Friends Receiving Payout (among insured friends)	54.79	54.29	55.31	-1.01
	(0.70)	(1.06)	(0.92)	(1.41)
PANEL C: OUTCOME VARIABLE				
Insurance Take-up Rate (%), Year One	41.39	42.64	39.91	2.73
	(0.84)	(1.14)	(1.23)	(1.68)
Insurance Take-up Rate (%), Year Two	52.85	49.92	56.26	-6.34
	(0.85)	(1.16)	(1.24)	(1.70)
No. of Households: 3474				
No. of Villages: 134				

Note: Standard errors are in brackets. 1 mu=1/15 hectare; 1 RMB=0.16 USD. In Panel B, payout rate (% of all households) indicates the rate of payout among all sample households, regardless of whether they purchased insurance; Payout rate among first year insured (%) is defined as the payout rate among households who purchased insurance (nonfree sample) or households who were willing to purchase the insurance (free sample).

Table 2. Randomization Check

Dependent variable: *Sample: All*	Household Head is Male (1)	Household Head Age (2)	Household Size (3)	Area of Rice Production (mu) (4)	Household Head is Literate (5)	Risk Aversion (0-1) (6)	Perceived Probability of Future Disasters (7)
PANEL A: PRICE RANDOMIZATION							
Price (RMB/mu)	-0.000453	0.00239	-0.000636	0.0885	0.00346	-0.00305	0.00147
	(0.00159)	(0.0983)	(0.0213)	(0.100)	(0.00468)	(0.0026)	(0.162)
Observations	3,474	3,471	3,471	3,450	3,471	3474	3,474
R-squared	0.010	0.015	0.015	0.045	0.010	0.009	0.005
PANEL B: FREE RANDOMIZATION							
Free Year 1 (1 = Yes, 0 = No)	-0.00838	0.490	0.172	-0.564	0.00460	-0.0056	0.438
	(0.00650)	(0.498)	(0.114)	(0.719)	(0.0177)	(0.0098)	(0.450)
Observations	3,474	3,471	3,471	3,450	3,471	3474	3,474
R-squared	0.011	0.016	0.016	0.046	0.010	0.009	0.006
Mean value of dependent variable, Free=0	0.9732	52.8549	5.1699	11.9615	0.7164	0.1997	32.8307

Note: Robust standard errors clustered at the village level in parentheses.

Table 3. Effect of First Year Subsidy on Second Year Insurance Demand

Dependent variable:	Insurance Take-up Year 2 (1 = Yes, 0 = No)		
Sample: All	(1)	(2)	(3)
Price (RMB/mu)	-0.0487	-0.0489	-0.0509
	(0.00545)	(0.00538)	(0.00759)
Free Year 1 (1 = Yes, 0 = No)	0.0597	0.0568	0.0388
	(0.0304)	(0.0306)	(0.0507)
Price * Free Year 1			0.00442
			(0.0106)
Household Head is Male		-0.0288	-0.0282
		(0.0516)	(0.0519)
Household Head Age		0.00276	0.00275
		(0.000851)	(0.000851)
Household Size		0.0115	0.0114
		(0.00372)	(0.00372)
Household Head is Literate		0.0589	0.0588
		(0.0200)	(0.0201)
Area of Rice Production (mu)		0.00211	0.00212
		(0.000774)	(0.000775)
Risk Aversion (0–1)		0.0758	0.0764
		(0.0285)	(0.0285)
Perceived Probability of Future Disasters (%)		0.000905	0.000906
		(0.000536)	(0.000537)
Mean value of dependent variable, Free=0	0.4992	0.4992	0.4992
Observations	3,474	3,442	3,442
R-squared	0.036	0.049	0.049
P-value of joint significance test:			
Price and Price*Free			0.0000
Free and Price*Free			0.1788

Notes: Robust standard errors clustered at the village level in parentheses. 1 mu=1/15 hectare; 1 RMB=0.16 USD.

Table 4. Effect of Receiving Payouts on Second Year Insurance Demand

Dependent variable:	Insurance Take-up Year 2 (1 = Yes, 0 = No)						
Sample: Insurance Take-up Year 1=Yes	*Non-free Year 1*			*Free Year 1*			*All Sample*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Price	-0.0441	-0.0778	-0.0716	-0.0469	-0.0639	-0.0673	-0.0464
	(0.00868)	(0.0137)	(0.0135)	(0.00998)	(0.0196)	(0.0217)	(0.00656)
Payout (1 = Yes, 0 = No)	0.368	0.102	0.204	0.168	0.0479	0.0613	0.368
	(0.0355)	(0.0827)	(0.109)	(0.0406)	(0.0860)	(0.124)	(0.0349)
Price * Payout		0.0642	0.0526		0.0306	0.0360	
		(0.0166)	(0.0179)		(0.0224)	(0.0262)	
Free Year 1 (1 = Yes, 0 = No)							0.102
							(0.0479)
Payout*Free Year 1							-0.172
							(0.0566)
Loss rate in yield			-0.00198			0.00480	
			(0.00303)			(0.00493)	
Square of loss rate in yield			0.000023			-0.000067	
			(0.000031)			(0.00005)	
Mean value of dependent variable	0.499	0.499	0.499	0.563	0.563	0.563	0.528
Observations	790	790	790	632	632	632	1,422
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.243	0.263	0.261	0.128	0.133	0.137	0.17
P-value of joint significance test: Price and Price*Payout		0.0000	0.0000		0.0001	0.0001	
Payout and Price*Payout		0.0000	0.0000		0.0004	0.0276	
Payout and Payout*Free							0.0000
Free and Payout*Free							0.0098

Note: This table is based on the sample of households who purchased insurance (nonfree) or agreed to purchase insurance (free) with 70% government subsidies in Year 1. In columns (3) and (6), payout is instrumented by the cutoff of yield loss to receive payout. Household characteristics include gender, age, level of education of the household head, rice production area, household size, risk attitude, and the perceived probability of future disasters. Robust standard errors clustered at the village level in parentheses.

Table 5. Effect of Observing Friends Receiving Payouts on Second Year Insurance Demand

Dependent variable:	Insurance Take-up Year 2 (1 = Yes, 0 = No)				
Sample:	*All*	*Non-free*		*Free*	
		Year 1 Insurance Non-takers	*Year 1 Insurance Takers*	*Year 1 Insurance Non-takers*	*Year 1 Insurance Takers*
	(1)	(2)	(3)	(4)	(5)
Price	-0.0463	-0.0400	-0.0465	-0.0436	-0.0419
	(0.0055)	(0.0109)	(0.0086)	(0.0113)	(0.0103)
High Network Payout Rate (NetPayHigh)	0.2371	0.211	0.0555	0.2094	-0.0139
	(0.0312)	(0.0368)	(0.0574)	(0.0654)	(0.0672)
Payout (1 = Yes, 0 = No)			0.4073	0.2173	0.203
			(0.0532)	(0.0696)	(0.0578)
NetPayHigh*Payout			-0.0142	-0.1982	-0.0136
			(0.0810)	(0.0859)	(0.0828)
Free Year 1 (1 = Yes, 0 = No)	0.1303				
	(0.0410)				
NetPayHigh*Free Year 1	-0.102				
	(0.0500)				
Mean value of dependent variable	0.528	0.377	0.664	0.476	0.691
Observations	3179	962	665	918	625
Region fixed effects	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes
R-squared	0.096	0.175	0.304	0.097	0.134
P-value of joint significance test:					
HighNet and HighNet*Free	0.0000				
Free and HighNet*Free	0.0065				

Note: High network payout rate is defined as equal to 1 if network payout rate >=0.5 and 0 otherwise. Household characteristics include gender, age, level of education of the household head, rice production area, household size, risk attitude, and the perceived probability of future disasters. Regressions in columns (2) and (3) also control for the proportion of friends in one's social network who have purchased the insurance in the first year, instrumented with the network members' average default option and financial education. Robust standard errors clustered at the village level in parentheses.

Table 6. Payout Effects in the Long-term

Dependent variable:	Insurance Take-up Year 4 (1 = Yes, 0 = No)					
Sample:	*All*	*Financial education=1*	*Financial education=0*	*All*	*Financial education=1*	*Financial education=0*
	(1)	(2)	(3)	(4)	(5)	(6)
Payout 1 (1 = Yes, 0 = No)	0.0599	0.242	0.0245	0.112	0.422	0.0542
	(0.0534)	(0.109)	(0.0483)	(0.0529)	(0.113)	(0.0447)
Payout 2 (1 = Yes, 0 = No)	0.181	0.265	0.238	0.341	0.429	0.507
	(0.122)	(0.127)	(0.155)	(0.136)	(0.215)	(0.168)
Payout 3 (1 = Yes, 0 = No)	0.569	0.340	0.653	0.636	0.472	0.625
	(0.0797)	(0.0928)	(0.0883)	(0.120)	(0.129)	(0.125)
Payout 1 * Payout 2				-0.100	-0.267	-0.0812
				(0.177)	(0.274)	(0.193)
Payout 1 * Payout 3				-0.135	-0.339	0.0139
				(0.141)	(0.146)	(0.166)
Payout 2 * Payout 3				-0.610	-0.280	-0.600
				(0.511)	(0.796)	(0.491)
Payout 1 * Payout 2 * Payout 3				0.447	-0.428	0.224
				(0.757)	(1.429)	(0.595)
Mean value of dependent variable, Free=0	0.4361	0.51	0.389	0.4361	0.51	0.389
Observations	3,442	1,331	2,111	3,442	1,331	2,111
R-squared	0.073	0.139	0.135	0.073	0.248	0.192
First stage F-statistics	85.904	42.165	56.871	38.067	24.523	27.334
Test A: One-time learning tests (p-values)						
Payout 2+Payout 1*Payout 2=0				0.0592	0.1631	0.0008
Payout 3+Payout 1*Payout 3=0				0.0000	0.1529	0.0000
Payout 3+Payout 2*Payout 3=0				0.9524	0.7856	0.9531
Test B: Attention to last payout only tests (p-values)						
Payout 1+Payout 1*Payout 2=0				0.9454	0.5344	0.8875
Payout 1+Payout 1*Payout 3=0				0.8706	0.5618	0.6678
Payout 2+Payout 2*Payout 3=0				0.5991	0.8410	0.8378
Payout 1+Payout 2+Payout 1*Payout 2+ Payout 1*Payout 3+Payout 2*Payout 3=0				0.5675	0.9704	0.8665
Test C: Decay of payout effects tests (p-values)						
Payout 2 < Payout 1	0.1078	0.4334	0.058	0.0289	0.4862	0.0027
Payout 3 < Payout 1	0.0000	0.2991	0.0000	0.0001	0.3895	0.0000
Payout 3 < Payout 2	0.0195	0.3432	0.0335	0.0633	0.4213	0.2880
Joint significance of all terms including Payout 1				0.1885	0.0032	0.6705

Note: This table presents the instrumental variable estimation results of the payout effects in the long-term. Payout i refers to Payout in year i. Columns (1) and (3) are based on the whole sample, columns (2) and (4) on households that receive financial education, and columns (3) and (6) on households that did not receive financial education. All regressions include insurance take-up decisions in years 1 to 3. Instruments include: the randomized three interventions - first year free distribution, first year default, and second year price - and the interactions of the loss dummy in year i (=1 if loss >30% and =0 otherwise), loss dummy i * loss dummy j, and loss dummy 1 * loss dummy 2* loss dummy 3 with each of the three randomized interventions. All regressions also include region fixed effects and household characteristics. Robust standard errors clustered at the village level in parentheses.

Appendix - Supplementary Tables

Table A1. The Impact of Free Treatment on the Expectation of Price Drop in Year 2

Dependent variable:	Correct Answer to Price Questions (1 = Yes, 0 = No)	Insurance Take-up Year 2 (1 = Yes, 0 = No)
Sample:	*All*	*Free and 1st Year Price Randomization with Price=0*
	(1)	(2)
Price		-0.0469
		(0.0075)
Free Year 1 (1 = Yes, 0 = No)	-0.0184	0.0034
	(0.0190)	(0.0578)
Mean value of dependent variable, Free=0	0.8256	0.5779
Observations	3,442	1,855
Household characteristics	Yes	Yes
R-squared	0.040	0.029

Note: In the second year survey we asked each farmer what is the current year post-subsidy insurance price and whether they expect further price drop. The dependent variable of column (1) is a dummy variable equal to one if a farmer answered the two questions correctly, and zero otherwise. In column (2), we combine the free sample with a price randomization sample with zero price assignments during the first year. Household characteristics include gender, age, level of education of the household head, rice production area, household size, risk attitude, and the perceived probability of future disasters. Robust standard errors clustered at the village level in parentheses.

Table A2. Compare the Effect of the Amount of Payouts under Different Subsidy Policies, Insurance Takeup Year 1 = 1

Dependent variable:	Insurance take-up Year 2 (1 = Yes, 0 = No)				
Sample: Insurance Takeup Year 1 = 1	*Nonfree Year 1*		*Free Year 1*		*All*
	(1)	(2)	(3)	(4)	(5)
Price	-0.0436	-0.0710	-0.0460	-0.0561	-0.0457
	(0.0088)	(0.0124)	(0.0098)	(0.0159)	(0.0067)
Amount of Payout (1000 RMB)	1.5208	0.3384	0.5336	0.1036	1.5578
	(0.1641)	(0.3583)	(0.1926)	(0.4622)	(0.1548)
Price * Amount of Payout		0.2942		0.1088	
		(0.0789)		(0.1150)	
Free Year 1 (1 = Yes, 0 = No)					0.1018
					(0.0418)
Payout*Free Year 1					-0.8647
					(0.2408)
Mean value of dependent variable	0.499	0.499	0.563	0.563	0.528
Observations	790	790	632	632	1,422
Region fixed effects	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes
R-squared	0.229	0.243	0.117	0.118	0.150
P-value of joint significance test: Price and Price*Payout		0.0000		0.0001	
Payout and Price*Payout		0.0000		0.0222	
Payout and Payout*Free					0.0020
Free and Payout*Free					0.0000

Note: This table is based on the sample of households who purchased insurance (nonfree) or agreed to purchase insurance (free) with 70% government subsidies in Year 1. Household characteristics include gender, age, level of education of the household head, rice production area, household size, risk attitude, and the perceived probability of future disasters. Robust standard errors clustered at the village level in parentheses.

Table A3. Effect of Observing Friends Receiving Payouts on Second Year Insurance Demand

Dependent variable:	Insurance Take-up Year 2 (1 = Yes, 0 = No)			
Sample:	*Not insured in Year 1*	*Insured (not free) in Year 1*	*Insured (for free) in Year 1*	*All*
	(1)	(2)	(3)	(4)
Price	-0.0392	-0.0657	-0.0243	-0.0458
	(0.0108)	(0.0156)	(0.0278)	(0.0054)
Network Payout (1 = Yes, 0 = No)	0.218	-0.117	0.0894	0.2586
	(0.0469)	(0.0843)	(0.1313)	(0.0354)
Payout		0.4169	0.1868	
		(0.0410)	(0.0477)	
Network Payout*Payout		0.0266	-0.0219	
		(0.0177)	(0.0296)	
Free Year 1 (1 = Yes, 0 = No)				0.1508
				(0.0503)
Network Payout * Free Year 1				-0.1479
				(0.0596)
Mean value of dependent variable	0.377	0.664	0.691	0.528
Observations	962	665	625	3,179
Region fixed effects	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes
R-squared	0.175	0.309	0.134	0.097
P-value of joint significance test:				
Network Payout and Free*Network Payout				0.0000
Free and Free*Network Payout				0.0129

Note: Network payout rate is defined as equal to 1 if network payout rate >0 and 0 otherwise. Household characteristics include gender, age, level of education of the household head, rice production area, household size, risk attitude, and the perceived probability of future disasters. Regressions in columns (2) and (3) also control for the proportion of friends in one's social network who have purchased the insurance in the first year, instrumented with the network members' average default option and financial education. Robust standard errors clustered at the village level in parentheses.

Table A4. Effect of Subsidy Policies on Attention to the Product and Investment

Dependent variable:	Attendance (0-1)	Answer to payout question (1 = Right, 0 = Wrong)	Increased Rice Production Investment (1 = Yes, 0 = No)
Sample: Insurance Take-up Year 1 = 1	(1)	(2)	(3)
Free Year 1	-0.0148	-0.156	-0.112
(1 = Yes, 0 = No)	(0.0135)	(0.0446)	(0.0368)
Mean value of dependent variable			
First year takers, non-free	0.867	0.587	0.498
First year non-takers, non-free	0.862	0.313	0.240
First year non-takers, free	0.852	0.362	0.322
Observations	1,422	1,422	1,422
Region fixed effects	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes
R-squared	0.214	0.140	0.076

Note: This table is based on the sample of households who purchased insurance (nonfree) or agreed to purchase insurance (free) in Year 1. In the second year survey we asked each farmer the share of households received insurance payout in their village last year, the average magnitude of payout, and who received payout. The dependent variable of columns (2) is the correct rate of answers to those questions. We also asked each farmer whether they increased investment on rice production last year. The dependent variable of column (3) is a dummy variable equal to one if a farmer answered yes, and zero otherwise. Household characteristics include gender, age, level of education of the household head, rice production area, household size, risk attitude, and the perceived probability of future disasters. Robust standard errors clustered at the village level in parentheses.

Table A5. Test Price Anchoring Effect

Dependent variable:	Insurance Take-up Year 2 (1 = Yes, 0 = No)	
Sample:	*Year 1 Takeup = 1, Price <= 3.6*	
	(1)	(2)
Price	-0.0111	0.0058
	(0.0194)	(0.0279)
Free Year 1 (1 = Yes, 0 = No)	0.0146	0.1142
	(0.0350)	(0.0950)
Price * Free Year 1		-0.0398
		(0.0374)
Mean value of dependent variable,		
Free=0	0.4992	0.4992
Observations	746	746
Household Characteristics	Yes	Yes
R-squared	0.0182	0.0197
P-value of joint significance test:		
Price and Price*Free		0.3910
Free and Price*Free		0.4821

Note: This table is based on the sample of households that either purchased or were willing to purchase the insurance at 3.6 RMB/mu in the first year, and were offered the insurance at a price less or equal to 3.6 RMB/mu in the second year. Household characteristics include gender, age, level of education of the household head, rice production area, and household size. Robust standard errors clustered at the village level in parentheses.

Table A6. Payout Effects in the Long-term: First Stage of the IV Estimation

VARIABLES	Payout 1	Payout 2	Payout 3	Payout 1*Payout2	Payout 1*Payout3	Payout 2*Payout3	Payout 1*Payout2 *Payout3
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Loss dummy 1*Free	0.621	0.00123	0.00412	0.000880	-0.000689	0.000861	0.000482
	(0.0330)	(0.00546)	(0.00949)	(0.00289)	(0.00389)	(0.00226)	(0.00119)
Loss dummy 2*Free	-0.00897	0.247	0.0261	0.00262	0.00553	0.00528	0.00225
	(0.0356)	(0.0817)	(0.0161)	(0.00449)	(0.00687)	(0.00342)	(0.00185)
Loss dummy 3*Free	-0.0208	0.00597	0.198	0.00385	0.0114	0.000806	0.00191
	(0.0229)	(0.00586)	(0.0423)	(0.00300)	(0.00804)	(0.00206)	(0.00109)
Loss dummy 1*Loss dummy 2*Free	0.0440	-0.128	-0.00727	0.257	-0.000545	-0.00291	-0.000785
	(0.0556)	(0.111)	(0.0183)	(0.0788)	(0.00825)	(0.00431)	(0.00274)
Loss dummy 1*Loss dummy 3*Free	0.109	-0.00748	0.0973	-0.00547	0.418	-0.00124	-0.00172
	(0.0380)	(0.00655)	(0.0589)	(0.00340)	(0.0347)	(0.00238)	(0.00131)
Loss dummy 2*Loss dummy 3*Free	0.0474	-0.0503	0.161	2.58e-05	0.0330	0.0826	-0.00198
	(0.0386)	(0.128)	(0.0962)	(0.00676)	(0.0441)	(0.0832)	(0.00251)
Loss dummy 1*Loss dummy 2	-0.0899	0.469	-0.289	0.395	-0.149	0.0903	0.225
*Loss dummy 3*Free	(0.0868)	(0.162)	(0.152)	(0.0955)	(0.117)	(0.135)	(0.0929)
Loss dummy 1*Default	0.163	-0.000208	-0.00210	-0.000982	0.000304	0.000690	0.00230
	(0.0488)	(0.00668)	(0.0114)	(0.00425)	(0.00613)	(0.00316)	(0.00180)
Loss dummy 2*Default	0.0598	0.104	0.0321	0.00316	0.00774	0.00742	0.00315
	(0.0349)	(0.0772)	(0.0161)	(0.00530)	(0.00687)	(0.00455)	(0.00225)
Loss dummy 3*Default	-0.0186	0.00152	0.184	0.00143	-0.00588	0.000605	0.00188
	(0.0233)	(0.00612)	(0.0487)	(0.00376)	(0.00933)	(0.00244)	(0.00139)
Loss dummy 1*Loss dummy 2*Default	-0.00472	0.129	-0.0163	0.168	-0.00388	-0.00393	-0.00178
	(0.0781)	(0.104)	(0.0174)	(0.0760)	(0.00853)	(0.00449)	(0.00233)
Loss dummy 1*Loss dummy 3*Default	0.0765	0.000474	0.0810	-0.00107	0.200	0.000290	-0.00138
	(0.0512)	(0.00678)	(0.0626)	(0.00398)	(0.0376)	(0.00250)	(0.00154)
Loss dummy 2*Loss dummy 3*Default	0.0399	-0.144	0.00935	0.000549	0.0443	0.0424	-0.00505
	(0.0393)	(0.122)	(0.107)	(0.00846)	(0.0422)	(0.0867)	(0.00358)
Loss dummy 1*Loss dummy 2	-0.223	0.0293	-0.0466	-0.183	-0.192	-0.00926	-0.0167
*Loss dummy 3*Default	(0.125)	(0.168)	(0.147)	(0.107)	(0.103)	(0.119)	(0.0727)
Loss dummy 1*Price	0.0539	-0.00158	0.000690	-0.000813	0.000863	-0.000287	-0.000295
	(0.00644)	(0.000962)	(0.00186)	(0.000451)	(0.000753)	(0.000374)	(0.000221)
Loss dummy 2*Price	-0.012	0.0404	-0.00582	-0.000476	-0.00214	-0.00128	-0.000421
	(0.00421)	(0.0110)	(0.00241)	(0.000841)	(0.00113)	(0.000706)	(0.000368)
Loss dummy 3*Price	-0.000855	-0.000955	0.0361	-0.000330	0.000248	-0.000189	-0.000305
	(0.00387)	(0.00114)	(0.00754)	(0.000615)	(0.00127)	(0.000392)	(0.000209)
Loss dummy 1*Loss dummy 2*Price	0.00342	0.0295	0.00322	0.0399	0.00116	0.000811	0.000271
	(0.0137)	(0.0140)	(0.00280)	(0.0109)	(0.00126)	(0.000723)	(0.000458)
Loss dummy 1*Loss dummy 3*Price	-0.0227	0.000737	0.00945	0.000751	0.0102	0.000169	0.000215
	(0.00834)	(0.00107)	(0.0106)	(0.000656)	(0.00597)	(0.000422)	(0.000253)
Loss dummy 2*Loss dummy 3*Price	0.00285	-4.55e-05	0.00987	0.000105	-0.00437	0.0218	0.000547
	(0.00684)	(0.0182)	(0.0167)	(0.00101)	(0.00665)	(0.0127)	(0.000421)
Loss dummy 1*Loss dummy 2	0.00933	-0.0131	0.0136	-0.00683	0.0297	0.0178	0.0291
*Loss dummy 3*Price	(0.0219)	(0.0251)	(0.0228)	(0.0149)	(0.0151)	(0.0176)	(0.0104)
Free	-0.0234	-0.0403	-0.0793	-0.0152	-0.0194	-0.00989	-0.00548
	(0.0252)	(0.00842)	(0.0138)	(0.00496)	(0.00647)	(0.00342)	(0.00216)
Default	-0.0777	-0.0354	-0.0622	-0.0116	-0.0167	-0.0103	-0.00622
	(0.0240)	(0.00999)	(0.0162)	(0.00642)	(0.00894)	(0.00445)	(0.00315)
Price	-0.0300	-0.0134	-0.0290	-0.00467	-0.00743	-0.00361	-0.00130
	(0.00464)	(0.00188)	(0.00304)	(0.00111)	(0.00172)	(0.000907)	(0.000457)
Observations	3,442	3,442	3,442	3,442	3,442	3,442	3,442
R-squared	0.574	0.382	0.299	0.411	0.331	0.193	0.211
First-stage F statistics	198.828	22.866	43.169	12.594	21.195	3.444	7.982

Note: This table presents the first stage results of the IV estimation of payout effects in the long-term (Table 6). Payout i refers to Payout in year i. Loss dummy i is a dummy variable equaling to one if the loss rate in year i is larger than 30% and zero otherwise. All regressions also include region fixed effects and household characteristics. Household characteristics include gender, age, level of education of the household head, rice production area, household size, risk attitude, and the perceived probability of future disasters. Robust standard errors clustered at the village level in parentheses.

Table A7. Payout Effects in the Long-term: Reduced Form Estimation

Dependent variable:	Insurance Take-up Year 4 (1 = Yes, 0 = No)		
Sample:	*All*	*Financial education=1*	*Financial education=0*
	(1)	(2)	(3)
Loss dummy 1	0.110	0.237	0.0131
	(0.0502)	(0.0701)	(0.0640)
Loss dummy 2	0.193	0.169	0.199
	(0.0554)	(0.0832)	(0.0762)
Loss dummy 3	0.273	0.174	0.369
	(0.0461)	(0.0690)	(0.0586)
Loss dummy 1 * Free	0.0636	0.141	0.0655
	(0.0443)	(0.0546)	(0.0499)
Loss dummy 2 * Free	0.0608	0.121	0.0162
	(0.0461)	(0.0580)	(0.0645)
Loss dummy 3 * Free	0.0271	0.00235	-0.00624
	(0.0388)	(0.0569)	(0.0486)
Loss dummy 1 * Default	0.0949	0.106	0.0454
	(0.0429)	(0.0617)	(0.0516)
Loss dummy 2 * Default	0.0518	0.0704	0.0413
	(0.0449)	(0.0639)	(0.0636)
Loss dummy 3 * Default	-0.00277	-0.00366	0.00763
	(0.0395)	(0.0548)	(0.0487)
Loss dummy 1 * Price	-0.00847	-0.0173	0.000300
	(0.00810)	(0.0128)	(0.0106)
Loss dummy 2 * Price	-0.0147	-0.0281	-0.00339
	(0.0114)	(0.0186)	(0.0160)
Loss dummy 3 * Price	-0.0206	-0.0167	-0.0265
	(0.00786)	(0.0128)	(0.0105)
Free	0.0399	0.0664	0.0531
	(0.0361)	(0.0489)	(0.0432)
Default	0.00818	0.0234	-0.00131
	(0.0396)	(0.0572)	(0.0440)
Price	0.00406	0.0149	-0.00106
	(0.00697)	(0.0113)	(0.00921)
Mean value of dependent variable, Free=0	0.4361	0.51	0.389
Observations	3,442	1,331	2,111
Region fixed effects	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes
R-squared	0.113	0.143	0.13

Note: This table presents the reduced form estimation results of the payout effects in the long-term. lossdummy *i* refers to loss indicator in year *i* (=1 if loss >30% and =0 otherwise). Column (1) is based on the whole sample, column (2) uses households that receive financial education, and colums (3) is based on households that did not receive financial education. Free, Default, and Price refer to the randomized interventions of first year free distribution, first year default, and second year prices, respectively. Household characteristics include gender, age, level of education of the household head, rice production area, household size, risk attitude, and the perceived probability of future disasters. Robust standard errors clustered at the village level in parentheses.

Table A8. Effect of Receiving or Observing Payouts on Risk Aversion and Perceived Probability of Disasters

Dependent variable:	Risk Aversion Year 2 (0-1)			Perceived Probability of Future Disasters Year 2		
Sample:	*All*	*Year 1 Take-up = Yes*	*Year 1 Take-up = No*	*All*	*Year 1 Take-up = Yes*	*Year 1 Take-up = No*
	(1)	(2)	(3)	(4)	(5)	(6)
Free Year 1	0.00282	0.00721	-0.0061	-0.294	-0.887	2.260
(1 = Yes, 0 = No)	(0.0105)	(0.0260)	-0.0194	(0.829)	(1.651)	(1.833)
Payout		0.0302			1.900	
(1 = Yes, 0 = No)		(0.0216)			(1.522)	
Free Year 1 * Payout		-0.00925			0.0921	
		(0.0328)			(2.262)	
High Network Payout			0.005			0.176
(= 1 if % > median, and 0 otherwise)			(0.0180)			(1.574)
Free Year 1 * High Network Payout			0.0156			-3.030
			(0.0265)			(2.294)
Mean value of dependent variable, Free=0	0.151	0.151	0.151	24.942	24.942	24.942
Observations	3,442	1,422	1,880	3,442	1,422	1,880
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.026	0.034	0.031	0.019	0.025	0.027
P-value of joint significance test:						
Payout and Free Year 1*payout		0.2497			0.2435	
High Network Payout and Free Year 1*High Network Payout			0.5064			0.2284
Free Year 1		0.9566	0.8070		0.7050	0.4017

Note: Household characteristics include gender, age, level of education of the household head, rice production area, and household size. Robust standard errors clustered at the village level in parentheses.

Table A9. Effect of Receiving or Observing Payouts on Trust

VARIABLES	Trust on the Insurance Company Year 2 (0-1)		
		Year 1 Take-up	Year 1 Take-up
Sample:	All	= Yes	= No
	(1)	(2)	(5)
Free Year 1	0.0134	0.0272	-0.0313
(1 = Yes, 0 = No)	(0.0198)	(0.0449)	(0.0348)
Payout		-0.0527	
(1 = Yes, 0 = No)		(0.0390)	
Free Year 1 * Payout		0.0120	
		(0.0591)	
High Network Payout			0.0006
(= 1 if % > median, and 0 otherwise)			(0.0321)
Free Year 1 * High Network Payout			0.0499
			(0.0478)
Observations	3,442	1,422	1,880
Village fixed effects	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes
R-squared	0.030	0.042	0.040
P-value of joint significance test:			
Payout and Free Year 1*payout		0.2495	
High Network Payout and Free Year 1*High Network Payout			0.3300
Free Year 1		0.4815	0.5705

Note: Household characteristics include gender, age, level of education of the household head, rice production area, household size, risk attitude, and the perceived probability of future disasters. Robust standard errors clustered at the village level in parentheses.

Table A10. Heterogeneity of the Payout Effect, Insurance Take-up Year 1 = 1

Dependent variable:	Insurance take-up Year 2 (1 = Yes, 0 = No)	
Sample: Year 1 Takeup = Yes	*Non-free Year 1*	*Free Year 1*
	(1)	(3)
Price	-0.0434	-0.0454
	(0.00855)	(0.0106)
Payout	0.387	0.163
(1 = Yes, 0 = No)	(0.0549)	(0.0496)
Area of Rice Production (mu)	0.0084	0.000867
	(0.00596)	(0.00322)
Payout*Area of Rice Production	-0.00236	0.000513
	(0.00530)	(0.00289)
Mean value of dependent variable, Free=0	0.4992	0.4992
Observations	724	618
Region fixed effects	Yes	Yes
Household characteristics	Yes	Yes
R-squared	0.264	0.136
P-value of joint significance test: Payout and		
Payout*Income	0.0000	0.0002
Income and Payout*Income	0.0000	0.0005

Note: Household characteristics include gender, age, level of education of the household head, rice production area, household size, risk attitude, and the perceived probability of future disasters. Robust standard errors clustered at the village level in parentheses.