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Stated and Realized Demand for Parametric Rainfall Insurance among Rice Farmers in Vietnam

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Abstract

We study stated and realized demand for a new parametric insurance product against excessive rainfall among rice farmers in Vietnam's Mekong Delta, a region highly exposed to climate change. Using a household survey of 3,000 rice-farming households, we elicit willingness to pay (WTP) using a multiple-bounded dichotomous choice approach. Stated demand is substantial: 33% of respondents report a WTP of at least half the market price, and 18% report a WTP equal to or higher than the market price. Stated demand is significantly higher among men, younger respondents, and respondents reporting better self-assessed product understanding. Yet when insurance agents offered the product at a subsidized price below respondents' stated WTP, no respondent purchased it. We discuss mechanisms that may explain this discrepancy between stated and realized demand, including limited incentive compatibility of the WTP elicitation mechanism, changes in valuations, and contextual barriers to insurance adoption.

Keywords: Agriculture, parametric weather insurance, Vietnam, willingness-to-pay

JEL Codes: G52, Q14, Q12, O12

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1. Introduction

Parametric weather insurance is considered an important instrument for farm households in low- and middle-income countries (LMICs) to manage increasing weather risks (Carter et al. 2017). Insurance payouts can help farmers recover more quickly from weather-related damage (e.g., Bertram-Huemmer & Kraehnert 2018; Hill et al. 2019; Janzen & Carter 2019), while insurance coverage itself, even in the absence of an extreme weather event, can enable farmers to take on more profitable but riskier production choices (Cai et al. 2015; Cole et al. 2017; Hill et al. 2019; Karlan et al. 2014; Mobarak & Rosenzweig 2013). Yet, in most LMICs, markets for parametric weather insurance remain underdeveloped, and uptake is low for most existing insurance programs (GIZ 2021; Jensen & Barrett 2017; Platteau et al. 2017).

In this study, we examine stated and realized demand for a real-world parametric rainfall insurance product launched in Vietnam in 2022. The product, designed to protect rice farmers from losses caused by excessive rainfall, was developed by the insurtech company Igloo Insure.[1] We examine farmers' willingness-to-pay (WTP) for the rainfall insurance product and explore whether respondents' stated demand for insurance is associated with several pre-specified correlates: knowledge of the market price of the insurance product implemented through a randomized information treatment, perception of climate risks, experience with past rainfall risks, and locus of control. We further analyze the association between additional (non-pre-specified) variables – including gender, education, product understanding, and farming intensity – and stated demand.

Our analysis builds on the first wave of the Vietnam Rice Farmer Panel Survey, a household survey conducted among 3,002 rice-farming households in Vietnam's Mekong Delta in 2024. We elicited respondents' WTP for the rainfall insurance product using a sequential multiple-bounded dichotomous choice approach with hypothetical randomized price draws. Households received a premium subsidy voucher if their stated WTP exceeded a randomly determined price. The voucher entitled households to purchase the insurance product at a discount of 20-95% relative to the market price and could be redeemed with Igloo agents, who visited interested households with a substantial time lag after the survey.

Results show that respondents expressed substantial stated demand in the parametric rainfall insurance product. Using respondents' stated WTP for a 30-day, one-hectare parametric rainfall

[1] Registered under Axinan Pte. Ltd.

insurance policy, we find substantial demand at the market price and even stronger demand at subsidized prices: 57% of respondents report a positive WTP, 33% would buy at half the market price, and 18% indicated that they would purchase the insurance at the market price (USD 2).[2] When considering heterogeneity in stated demand, the results show limited explanatory power for most correlates. Among the pre-specified correlates, only recent exposure to rainfall anomalies, particularly exceptionally low rainfall, is associated with modestly higher stated demand. The other correlates are not strongly predictive, regardless of whether we control for additional characteristics. Among non-pre-specified correlates, we document higher stated demand among male respondents, younger respondents, and among those reporting greater self-assessed product understanding.

In contrast to our findings on substantial stated demand, realized demand was zero: none of the 1,375 households that received a premium subsidy voucher redeemed it and purchased insurance from an insurance agent, despite the product being offered at a price below their stated WTP. We therefore focus on explaining the gap between stated and realized demand, using contextual information.

Our study contributes to two strands of literature. First, our analysis speaks to the extensive empirical literature on the determinants of demand for parametric agricultural insurance.[3] Examining stated and realized demand for a real-world product within the same sample allows us to contrast what farmers report they are willing to pay with their actual purchase decisions when offered the product at a discount. We analyze which farmer characteristics are associated with stated WTP, and, since no household purchased the product, we draw on features of the study setting to discuss what may have prevented stated demand from translating into uptake. Our analysis also adds to the empirical literature on the price sensitivity of demand for parametric agricultural insurance in LMICs. Some prior studies demonstrate that premium discounts can substantially increase demand. When randomly allocating discount vouchers for parametric weather insurance to farmers in rural India, both Cole et al. (2013) and Hill et al. (2016) find strong evidence of price sensitivity: a 10% reduction in the price of insurance increases demand by 10% (Cole et al. 2013) to 19% (Hill et al. 2016). Similarly, studies by Janzen and Carter (2019) and Matsuda et al. (2019) find that pastoralists in Kenya and Ethiopia,

[2] Throughout the study, we assume an exchange rate of VND 25,000 per USD, which falls within the observed range (VND/USD 24,356-25,497) during our data collection period (January 8-May 13, 2024).

[3] See Carter et al. (2017) and Kramer et al. (2022) for reviews of the literature on index-based agricultural insurance and Eling et al. (2014) for a review of the literature on microinsurance demand.

respectively, who received larger discount vouchers were significantly more likely to purchase index-based livestock insurance. In line with Cole et al. (2013), we find that lowering prices alone may be insufficient to generate demand for parametric insurance: even large discounts of up to 95% did not induce a single purchase among the rice farmers in our sample. This underscores the importance of non-price-related frictions, which can prevent adoption even if the price of insurance is below farmers' stated WTP.

Second, our study contributes to the broader discussion on the interpretation of WTP elicited in surveys. Eliciting WTP in surveys is widely used in development economics to infer demand for unfamiliar products and services (Ben Yishay et al. 2017; Berry et al. 2020; Burchardi et al. 2021; Grimm & Hartwig 2022; Hidrobo et al. 2022; Lee et al. 2020). In principle, incentive-compatible mechanisms, such as the Becker-DeGroot-Marschak (BDM) approach, can elicit individuals' true valuation of goods under controlled conditions. In practice, this feature can be undermined by real-world enforcement and credibility constraints (Hoffmann 2018). If spot purchases cannot be strictly implemented, survey respondents may provide strategically biased information about their WTP. Refusal to purchase after the price has been announced or payment defaults are recurring challenges. Patterns consistent with this concern – such as non-compliance after prices are announced or payment defaults – have been documented in BDM-based WTP studies in other settings, including business training programs in Jamaica (Maffioli et al. 2023) and household water purifiers in India (Hoffmann 2018). In our setting, despite substantial stated WTP and the provision of premium subsidy vouchers, none of the sampled households redeemed vouchers and purchased rainfall insurance. This discrepancy underscores the limits of interpreting survey-based WTP as effective demand when redemption and purchase do not materialize. We discuss possible explanations, including overstatement of stated valuations arising from limited enforceability during the elicitation, valuation updating over time, and contextual barriers.

The remainder of this study is structured as follows. Section 2 provides contextual information on rice farming, weather risks, and agricultural insurance in Vietnam's Mekong Delta. Section 3 introduces the data. Section 4 outlines the study design. Section 5 presents results on the distribution and determinants of stated WTP. Section 6 discusses potential mechanisms explaining the gap between stated and realized demand. Section 7 concludes.

2. Empirical Context and Insurance Design

2.1 Rice Farming in Vietnam

Vietnam is one of the world's largest producers and exporters of rice. In 2023, the country produced approximately 43 million metric tons of paddy rice (National Statistics Office of Viet Nam 2026), of which 8.1 million metric tons were exported, making Vietnam the world's third-largest rice exporter after India and Thailand (World Bank 2025). The Mekong Delta, often referred to as the country's 'rice bowl,' is home to approximately 1.5 million rice farmers who benefit from the region's fertile soils and abundant water resources (The Anh 2020). The region accounts for more than half of Vietnam's total rice production (National Statistics Office of Viet Nam 2026). Agriculture remains central to the livelihoods of households in the Mekong Delta: More than 75% of the region's workforce resides in rural areas, and 37% is employed in the agricultural sector (General Statistics Office 2024). Smallholder farmers in the Mekong Delta commonly cultivate paddy rice during two or three cropping seasons each year.

Rice production in the Mekong Delta faces increasing pressure from both environmental and human-induced factors, including soil degradation, water pollution, upstream water extraction and hydropower development, as well as the growing impacts of climate change (Tran et al. 2024). In the region, climate change is associated with rising temperatures, sea-level rise that contributes to saltwater intrusion, and increasingly erratic and extreme rainfall patterns. Regional climate models project further increases in both mean and extreme rainfall under the RCP4.5 and RCP8.5 scenarios until the end of the 21st century (Ministry of Natural Resources and Environment 2021). These rainfall anomalies are expected to exacerbate existing challenges in floodplain management, including flooding and waterlogging, posing significant risks to rice production (Triet et al. 2018). Managing flood risk has long been a political priority (Delgado et al. 2010) and is becoming increasingly urgent as climate change intensifies.[4]

In the past, government responses relied primarily on structural flood protection measures such as dikes, embankments, and sluice gates (Mai et al. 2024; Triet et al. 2018), which have increasingly been criticized for their ecological and social side effects (Hoang et al. 2018; Mai et al. 2024; Thanh et al. 2020). More recent strategies have shifted toward more integrated, non-

[4] Hirabayashi et al. (2013) project a marked increase in flood frequency in the Mekong Delta under 21st century climate conditions, using 11 atmosphere-ocean general circulation models combined with river-routing models and assuming non-climatic factors remain unchanged. Their results suggest that a flood comparable to the historical 100-year event could occur approximately once every 15 years, although projections vary across models.

structural approaches that account for socio-economic factors and vulnerabilities (Merz et al. 2010; Triet et al. 2018). In the Mekong Delta, these efforts include promoting sustainable rice production systems (World Bank 2024), strengthening monitoring and warning systems (Socialist Republic of Vietnam 2022b), revising official recommendations on seeding calendars (Ferrer et al. 2022; Phuong-Dung et al. 2025), and supporting the development of agricultural insurance.

2.2 Agricultural Insurance in Vietnam

Vietnam's first indemnity-based agricultural insurance program was introduced by the state-owned insurer Bao Viet in 1982 and discontinued in 1999 after payouts persistently exceeded premiums (Lan et al. 2024; Reynaud et al. 2017). A government-supported pilot program for parametric insurance was launched in 2011, selling more than 135,000 policies across 21 provinces, but declined sharply after subsidies expired in 2018 (GIZ 2019; Lan et al. 2024; Shynkarenko & Shynkarenko 2021). Nevertheless, agricultural insurance remains a political priority under Vietnam's National Adaptation Plan and the National Strategy on Climate Change until 2050 (Socialist Republic of Vietnam 2022a, 2025).

Recent initiatives underscore the growing momentum for market-based insurance for smallholder farmers. The insurtech company Igloo Insure, supported by equity an investment from the InsuResilience Investment Fund via impact investor BlueOrchard Finance, launched a parametric rainfall insurance product for rice farmers in Vietnam in 2022. The product provides coverage against excessive rainfall. Farmers can purchase insurance at a cost of USD 2 per hectare of farmland per 30 days[5] and may combine consecutive policies to extend coverage across season as well as insure multiple hectares.[6] The insurance index is based on rainfall measured at a weather station in the farmer's district of residence.

Payouts are triggered when rainfall exceeds at least one of three pre-defined thresholds over a five-day period. Based on historical rainfall data, three rainfall thresholds are defined, and these thresholds vary by month and district. Payouts amount to USD 4.8 for the low threshold,

[5] During its initial phase, Igloo's rainfall product was offered at a 50% subsidized premium to stimulate demand. In the first quarter of 2024, the subsidy was reduced to 30%. From the second quarter of 2024 onward, subsidies were phased out, and the product was sold at the market price of VDN 50,000 (gross) for a policy covering one hectare of farmland for 30 days. Farmers were subject to a 10% VAT on rainfall insurance premiums until May 2024, when it was abolished.

[6] In general, farmers are not permitted to insure more land than they own. However, those owning less than one hectare may purchase insurance coverage for one hectare.

USD 24 for the medium threshold, and USD 240 for the high threshold.[7] Igloo processes payouts within five days.

The weather insurance product was initially designed to be distributed through multiple channels, including direct digital sales, insurance agents, and partnerships with farmer unions. Between 2023 and 2024, the most successful distribution channel was the mobile marketing platform of MobiFone, a major Vietnamese mobile network operator. According to Igloo customer data, through this platform, approximately 472,000 policies were sold to 95,000 unique customers by bundling the insurance product with mobile data top-up packages.[8]

Excessive rainfall affects rice production through two channels. First, it can wash away newly planted seedlings, requiring replanting. Second, it can waterlog mature plants, reducing yields. These risks are present across all three rice-growing seasons in the Mekong Delta. Among the 3,002 households surveyed in the Vietnam Rice Farmer Panel Survey (see Section 3), 21%, 32%, and 39% of households cultivating rice in the respective season reported experiencing excessive rainfall during the 2022/23 winter-spring, 2023 summer-autumn, and 2023 winter-spring seasons, respectively (Appendix Figure A1). Across the three seasons, 54% of surveyed households experienced at least one episode of excessive rainfall. Conditional on experiencing excessive rainfall in a given season, 24-29% of households reported additional production costs exceeding 20% (Figure A2), while 24-40% reported harvest losses exceeding 20% relative to a normal year (Figure A3).

In the Vietnam Rice Farmer Panel Survey, respondents were asked to consider three hypothetical scenarios in which excessive rainfall caused minor, moderate, or severe damage to their rice crops. The medians of their estimated associated losses are USD 80, USD 240, and USD 560, respectively. Although these losses are unlikely to threaten household livelihoods, they represent substantial income shocks relative to the median annual total household income in our sample (USD 7,185). These responses provide descriptive evidence on farmers' perceptions of the financial consequences of excessive rainfall. They also suggest that such events are economically meaningful for a substantial share of households in the Mekong Delta.

[7] If a higher rainfall threshold is exceeded and subsequently a lower threshold is exceeded within the same coverage period, only the payout associated with the higher threshold is made. Conversely, if a lower threshold is exceeded first and a higher threshold is exceeded later, Igloo pays a top-up equal to the difference between the two payout levels. If the same threshold is exceeded multiple times within a 30-day period, only a single payout is made.

[8] Igloo sold approximately 519,000 weather insurance policies in Vietnam between the product's launch in 2022 and 2024. The MobiFone channel thus accounted for about 91% of all policies sold.

3. Data Collection and Insurance Offers

3.1 Household Survey Data

This study draws on data from the Vietnam Rice Farmer Panel Survey (VRFPS), implemented jointly by the RWI – Leibniz Institute for Economic Research and the Mekong Development Research Institute (MDRI). The panel survey consists of three annual waves; the analysis presented here uses data from the first wave.

The survey collects socioeconomic data from rice-farming households in Vietnam's Mekong Delta. Its design was primarily tailored to study demand for, and potential impacts of, Igloo's parametric rainfall insurance product. Accordingly, the survey area was restricted to provinces in which the insurance product was available at the time of data collection. Coastal provinces were excluded due to the distinct risks associated with saltwater intrusion, resulting in a sample drawn from four provinces: An Giang, Can Tho, Dong Thap, and Long An (see map in Appendix Figure A4).

A three-stage stratified design was used to select households. In total, the sample comprises 3,002 rice-farming households across 200 villages. MDRI enumerators conducted face-to-face interviews, typically at respondents' homes. The survey collects detailed information on agricultural production, climate adaptation, climate impacts, perceptions and awareness of climate change, income, assets, financial inclusion, migration and remittances, locus of control, and household demographics.

Data collection took place between January and May 2024. More specifically, interviews were conducted from January 8 to February 5 in An Giang, Dong Thap, and Long An provinces, and from May 2 to May 13 in Can Tho province.

3.2 Eliciting Willingness-to-Pay

At the end of the wave one survey interview, enumerators elicited households' WTP for Igloo's parametric rainfall insurance product. We implemented a sequential multiple-bounded dichotomous choice design in which respondents are exposed to ordered price points with interval follow-ups. A randomized price draw was used to increase the salience of price

variation in the elicitation, but it was not binding.[9]

The WTP exercise was conducted with the household head (86% of the sample), or, if absent, with the spouse (7%) or another adult household member (7%). Enumerators first introduced the purpose of the exercise. Respondents then received standardized information about the insurance product via a five-minute video (shown on the enumerators' tablets) and an accompanying information leaflet. The video described the insurance product, including the index, triggers, and purchase process. It also introduced the WTP exercise and informed respondents that they could receive a voucher to purchase insurance at a discounted price if their stated WTP was at least equal to a randomly drawn voucher price.

After viewing the video, respondents were asked to confirm their understanding of both the insurance product and the WTP exercise. If they did not, enumerators provided additional clarification. For 104 respondents (3%) who, after this additional explanation, still did not demonstrate understanding of either the insurance product or the WTP exercise, the WTP module was not administered.

Respondents were first asked whether they would take the insurance product for free. They were then asked whether they would purchase one insurance policy covering one hectare of farmland for 30 days at increasing prices: VND 5,000 (USD 0.2), VND 15,000 (USD 0.6), VND 30,000 (USD 1.2), VND 45,000 (USD 1.8), and VND 55,000 (USD 2.2). If respondents declined a given price, they were asked to state their maximum WTP within the preceding price interval. Respondents indicating a WTP of VND 55,000 were asked an open-ended question on their maximum WTP.[10]

Upon completion of the WTP module, enumerators offered vouchers to respondents whose stated WTP exceeded a randomly drawn price. The 1,646 respondents with a positive WTP were asked to roll two dice.[11] Each possible sum of dice was mapped to a price offer between VND 2,500-40,000, corresponding to a 20-95% discount relative to the market price (Appendix Table A1). Respondents whose WTP was at least as high as the drawn price received a voucher

[9] Our elicitation design combines features of double-bounded contingent valuation (Hanemann et al. 1991) with randomized price framing commonly used in demand estimation studies based on exogenous price variation (e.g., Hill et al. 2016; Janzen & Carter 2019). In the Vietnamese context, it was not feasible to implement a binding mechanism for WTP elicitation, such as an incentive-compatible auction design.

[10] In the analyses presented below, we winsorized WTP at the 99.5th percentile, at USD 8, which is four times the market price. Nine respondents stated values larger than USD 8, ranging from USD 12-40.

[11] For additional 13 households that stated a WTP of zero enumerators also rolled the dice.

to purchase insurance. This voucher entitled recipients to purchase insurance coverage at the subsidized price, with flexible coverage durations (30, 60, 90, 120, or 150 days) and insured land area (one to five hectares). For recipients choosing the maximum coverage (150 days and 5 hectares), the voucher value ranged from USD 10 (20% discount) to USD 47.5 (95% discount). In total, 1,375 respondents (84% of households with a WTP>0) received a voucher (Appendix Table A2).

The magnitude of the discounts was informed by studies on demand for parametric weather insurance in LMICs. In India, Hill et al. (2016) randomly allocated price vouchers enabling farmers to purchase weather index insurance at 15-60% discounts. In Kenya, Janzen and Carter (2019) randomly distributed discount vouchers to pastoralists, allowing them to purchase index-based livestock insurance at discounts of 10-60%. In Ethiopia, Matsuda et al. (2019) offered pastoralists randomly assigned discounts of between 10-80% to encourage uptake of index-based livestock insurance.

3.3 Insurance Offers

Voucher recipients could redeem their vouchers by calling the Igloo hotline number printed on them. In addition, Igloo agents attempted to contact all recipients by phone and offered to arrange for home visits. During these visits, agents would provide information about the insurance product, facilitate voucher redemption, and complete insurance sales. It was initially planned that households would be contacted by Igloo agents within a few days of the survey interviews. However, these activities were suspended after three days for administrative reasons. By that time, 126 households had been contacted, and 22 home visits had been conducted. Agent activities resumed in April 2024. In the provinces of An Giang, Dong Thap, and Long An, voucher recipients were contacted between 67 and 111 days after the survey interviews. Vouchers in these three provinces were initially valid from February to June 2024 but were subsequently extended to May to September 2024. In Can Tho province, where the household survey was conducted in May 2024, the interval between the survey and agent contact was shorter, with phone calls taking place between 16 and 34 days after data collection. Vouchers in Can Tho province were valid from May to November 2024.

Of the 1,375 respondents who received a voucher, 914 were successfully contacted by phone by Igloo agents (Appendix Table A2). During these calls, 324 respondents agreed to a home visit, of whom 185 were successfully visited by insurance agents. According to Igloo, no

households ultimately redeemed a voucher or purchased rainfall insurance.

4. Study Design

4.1 Research Questions

The study is guided by an analysis plan registered with the AEA RCT Registry (AEARCTR-0014116), which was finalized after survey completion but before data analysis.[12]

The analysis plan defines two outcomes: (i) stated demand for Igloo's parametric rainfall insurance product, measured by WTP for one 30-day policy covering one hectare, and (ii) realized demand for the rainfall insurance product, measured as actual purchases. Since no surveyed households ultimately purchased insurance, the analysis focuses on stated demand.

The pre-specified correlates of demand include: (i) knowledge of the market price, experimentally varied through randomized information provision in a survey experiment; (ii) perceptions of climate change; (iii) experience with extreme rainfall events; and (iv) locus of control.[13] We further examine additional correlates motivated by the literature but not pre-specified. Table 1 reports summary statistics.

Knowledge of the Market Price

We use a survey experiment to examine whether providing information about the market price affects respondents' willingness to pay (WTP), consistent with an anchoring effect. Respondents randomly assigned to the treatment group were informed by enumerators, immediately before the WTP module, that the market price of the insurance was VND 55,000 per hectare per month. Treatment assignment was implemented at the respondent level using the survey software's randomization function.[14]

Perceptions of Climate Change

We hypothesize that perceptions of changes in rainfall patterns may affect perceived exposure

[12] The analysis plan was submitted on August 2, 2024, before it was known that none of the surveyed households had redeemed a voucher to purchase Igloo's rainfall insurance product.

[13] The analysis plan additionally includes the receipt of a subsidy voucher and the voucher value as pre-specified correlates of demand. However, as vouchers were distributed after the WTP elicitation and could thus not have affected the stated valuation, we do not consider them further.

[14] A balance test, displayed in Appendix Table A3, indicates that the treatment and control groups are well-balanced across a wide range of household characteristics.

to weather risk and, consequently, insurance demand. We elicit both perceptions of changes over the past ten years and expectations for the next ten years using four survey items covering (i) annual rainfall and (ii) the length of the rainy season. Specifically, respondents compare rainfall patterns in 2003-2013 with those in 2013-2023 and report their expectations for the subsequent ten years. Responses are categorized as decrease/shorter, no change, or increase/longer. We construct four indicator variables equal to one if respondents perceive or expect an increase in annual rainfall or the length of the rainy season.

Experience with Extreme rainfall

Recent exposure to extreme rainfall may increase the salience of weather risk and, in turn, insurance demand (Cai & Song 2017; Gallagher 2014; Mogge & Kraehnert 2025). We measure recent exposure using two survey items that ask whether the household experienced exceptionally high or exceptionally low rainfall during any of the three rice-growing seasons preceding the survey. The measure is based on respondents' self-assessments; no definition of exceptionally high or low rainfall was provided.

Locus of Control

Locus of control captures the extent to which individuals attribute outcomes to their own actions rather than to external forces (Rotter 1966). It may influence insurance demand by shaping perceptions of agency and risk management. Existing evidence suggests that individuals with a more internal locus of control are more likely to purchase supplementary health insurance in Germany (Bonsang & Costa-Font 2022), while locus of control is not significantly associated with farmers' WTP for climate information services in Senegal (Muriithi et al. 2025). We measure locus of control using 10 survey items that elicit respondents' agreement with statements reflecting internal (five items) and external (five items) control beliefs. Responses are recorded on an 11-point Likert scale ranging from 0 to 10. We reverse-code external-control items such that higher values consistently indicate a more internal locus of control, extract the first principal component of the resulting items, and standardize the index to have a mean of zero and a standard deviation of one.

Additional Correlates

We also examine correlates not pre-specified in the analysis plan, including respondents' socio-demographic characteristics (gender, age, and education), self-assessed understanding of the insurance product (measured on a 0-10 Likert scale), and production characteristics (whether households cultivated rice in all three 2023 seasons and average seasonal rice harvest).

These variables are motivated by prior literature on demand for weather insurance. Socio-demographic characteristics are commonly examined predictors and are readily observable, making them relevant for potential targeting. Product understanding has been identified as an important constraint to insurance uptake and may indicate whether informational interventions could increase demand. Finally, rice production intensity may affect both perceived exposure to weather-related risk and households' ability to afford insurance.

Table 1: Summary statistics

	Mean	Std. dev.	Min	Median	Max	N
Dependent variables						
WTP for rainfall insurance (in USD)	0.84	1.22	0	0.32	8	2,896
WTP for rainfall insurance is positive (0-1)	0.57	0.50	0	1	1	2,896
WTP for rainfall insurance is at least half of market price (0-1)	0.33	0.47	0	0	1	2,896
WTP for rainfall insurance is at least market price (0-1)	0.18	0.38	0	0	1	2,896
Pre-specified correlates						
Received information on market price of rainfall insurance (0-1)	0.50	0.50	0	0	1	2,896
Climate perception: Perceived increase in annual rainfall in past 10 years (0-1)	0.35	0.48	0	0	1	2,872
Climate perception: Perceived longer rainy season in past 10 years (0-1)	0.32	0.47	0	0	1	2,865
Climate perception: Expected increase in annual rainfall in next 10 years (0-1)	0.28	0.45	0	0	1	2,746
Climate perception: Expected longer rainy season in next 10 years (0-1)	0.25	0.43	0	0	1	2,747
Experience with extreme events: Excessive rainfall in 2023 (0-1)	0.54	0.50	0	1	1	2,896
Experience with extreme events: Low rainfall in 2023 (0-1)	0.22	0.42	0	0	1	2,896
Locus of control (in std. dev.)	0.01	0.99	-5.24	0.14	2.18	2,838
Additional correlates (not pre-specified)						
Female (0-1)	0.10	0.30	0	0	1	2,896
Age (in years)	53.76	11.05	23	53	75	2,896
Secondary or higher education (0-1)	0.36	0.48	0	0	1	2,896
Self-assessed understanding of rainfall insurance (0-10)	6.17	2.28	0	6	10	2,896
Household cultivated rice in 3 seasons in 2023 (0-1)	0.66	0.47	0	1	1	2,896
Household's average rice harvest per season in 2023 (in tons)	15.37	18.02	0	9.75	317.35	2,891

Notes: The four WTP measures, the receipt of information on the market price, and product understanding refer to Igloo's parametric rainfall insurance with a 30-day rainfall insurance policy covering one hectare. Age is calculated as the midpoint of five-year brackets. For "secondary or higher education", the reference category is no or primary education. The continuous WTP is in 2024 USD. Source: VRFPS (wave 1).

4.2 Empirical Strategy

We begin by graphically depicting the inverse demand curve for a 30-day rainfall insurance policy covering one hectare of farmland. This shows the share of respondents willing to purchase the insurance product at each price.

Following Hidrobo et al. (2022), we then present inverse demand curves for each correlate, each dividing the sample into two mutually exclusive groups,[15] and plot the difference in the share of households with $WTP \geq p$ across the price range. To quantify these associations, we estimate three complementary specifications for each explanatory variable $X_{hv,i} \in X = \{X_{hv,1}, X_{hv,2}, \ldots, X_{hv,K}\}$:[16]

$$(1)\ D_{hv} = \beta_i X_{hv,i} + \varepsilon_{hv},$$

$$(2)\ D_{hv} = \beta_i X_{hv,i} + \gamma' X_{hv,(-i)} + \varepsilon_{hv},$$

$$(3)\ D_{hv} = \beta_i X_{hv,i} + \gamma' X_{hv,(LASSO_i,-i)} + \varepsilon_{hv},$$

where D_{hv} denotes the stated demand of household h in village v. $X_{hv,(-i)}$ comprises all explanatory variables except $X_{hv,i}$. In the third specification, $X_{hv,(LASSO_i,-i)}$ includes only the subset of variables selected by an adaptive LASSO procedure (Belloni et al. 2013), using Stata's *dsregress* command. Standard errors are clustered at the village level. The coefficient β_i captures the average difference in stated demand between households with and without characteristic X_i, conditional on the included controls. We estimate each specification using the continuous measure of WTP (in USD) and three binary indicators equal to one if $WTP >$USD 0, $WTP \geq$USD 1 (half the market price), and $WTP \geq USD\ 2$ (the market price). The latter serves as our main specification.

The sample comprises all 2,896 survey respondents who completed the WTP module. We assign a WTP of zero to respondents who would not accept the rainfall insurance if offered free of charge and exclude the two respondents who refused to answer this question.

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[15] Continuous explanatory variables are transformed into binary variables using the sample median as the cutoff.

[16] Vector X comprises the 14 potential factors listed in Table 1: the eight prespecified in the analysis plan and six additional factors.

5. Results

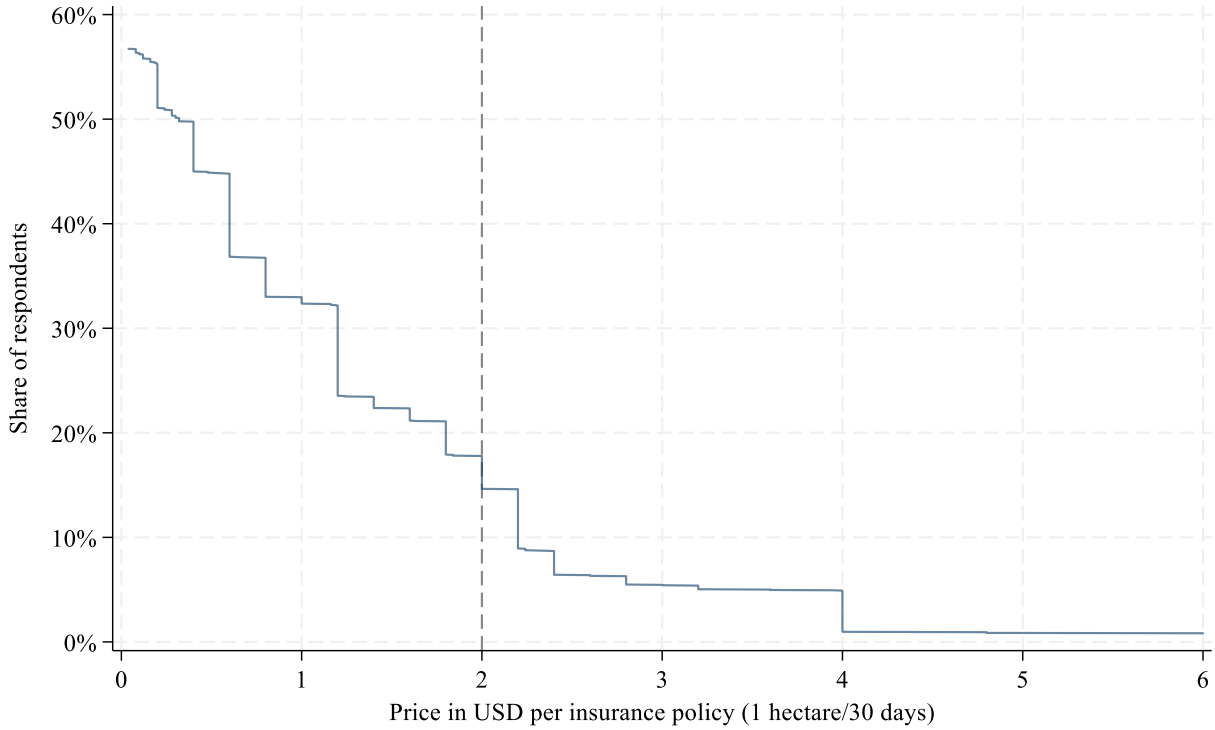
5.1 Inverse Demand Curve

Figure 1 presents the inverse demand curve for a 30-day rainfall insurance policy covering one hectare of farmland, based on respondents' stated WTP. The curve plots, for each price p, the share of respondents whose WTP is greater than or equal to p over a price range of USD 0-6. Overall, 57% of respondents reported a positive WTP, and 33% indicated that they would purchase the insurance at a price of USD 1 (half the market price). At the market price of USD 2 (indicated by the dashed vertical line), 18% indicated that they would purchase the insurance. At prices above USD 4, stated demand is close to zero.[17]

These results suggest substantial stated demand for rainfall insurance at the market price and even stronger stated demand at subsidized prices. For example, halving the market price would approximately double the share of households willing to purchase the insurance. This substantial stated demand contrasts sharply with the absence of realized purchases, a discrepancy that we examine in Section 6.

[17] Only 28 respondents (less than 1% of the sample) reported a WTP exceeding USD 4.

Fig. 1: Inverse demand curve for rainfall insurance



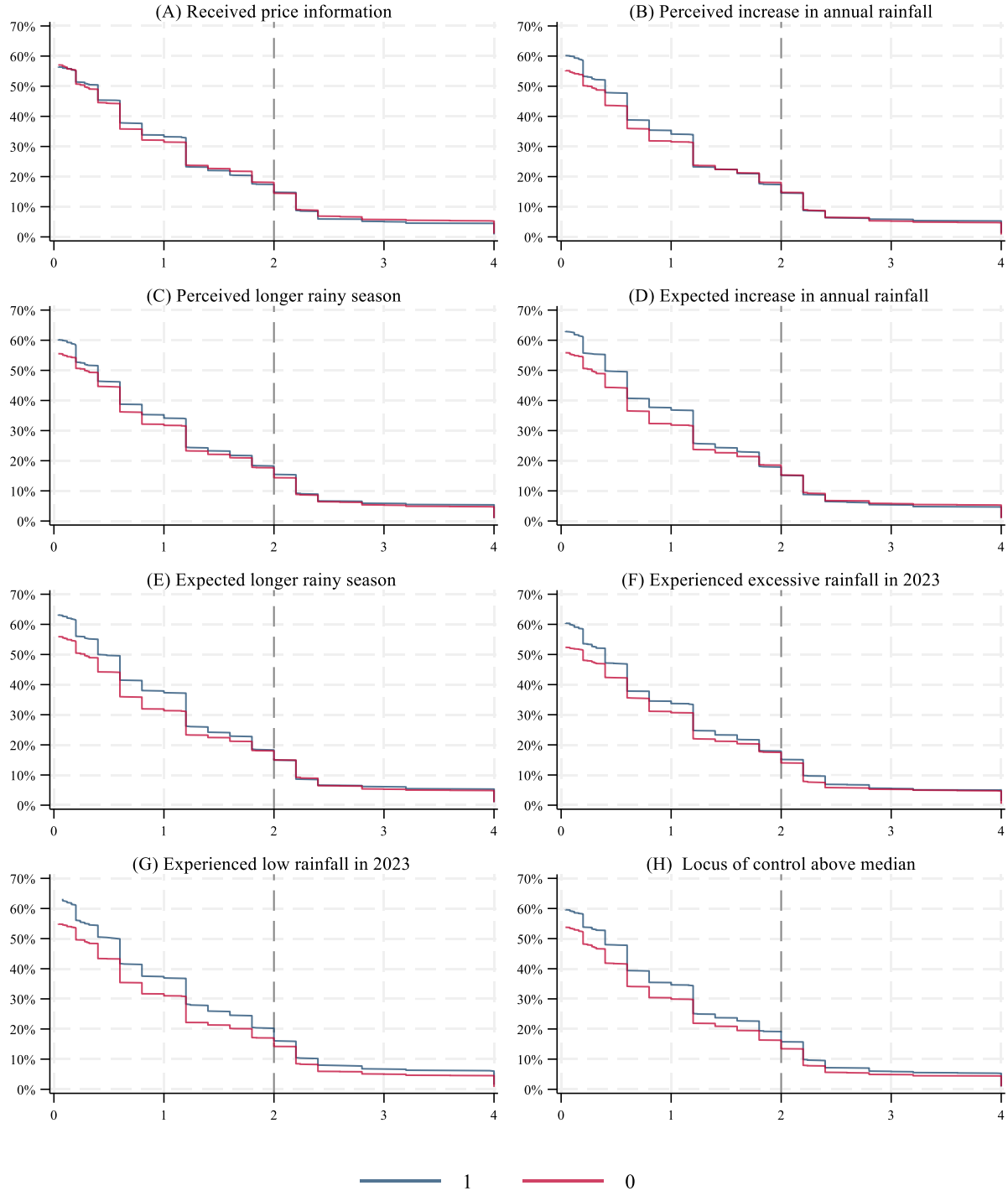
Notes: The figure displays, for each price p, the share of respondents whose stated WTP is at least p for a 30-day rainfall insurance policy covering one hectare. The dashed vertical line indicates the market price (USD 2). Source: VRFPS (wave 1).

5.2 Heterogeneity in Pre-Specified Correlates

Next, we examine heterogeneity in stated demand across eight pre-specified correlates grouped into four dimensions: information about the market price, perceptions and expectations regarding past and future rainfall patterns, recent experience with extreme rainfall events, and locus of control.

Figure 2 presents inverse demand curves by correlate, truncated at USD 4 for clarity. The curves indicate limited heterogeneity in stated demand across most dimensions. Differences, where present, are concentrated at lower prices and generally diminish as prices increase.

Fig. 2: Inverse Demand Curves for Rainfall Insurance by pre-specified Correlates

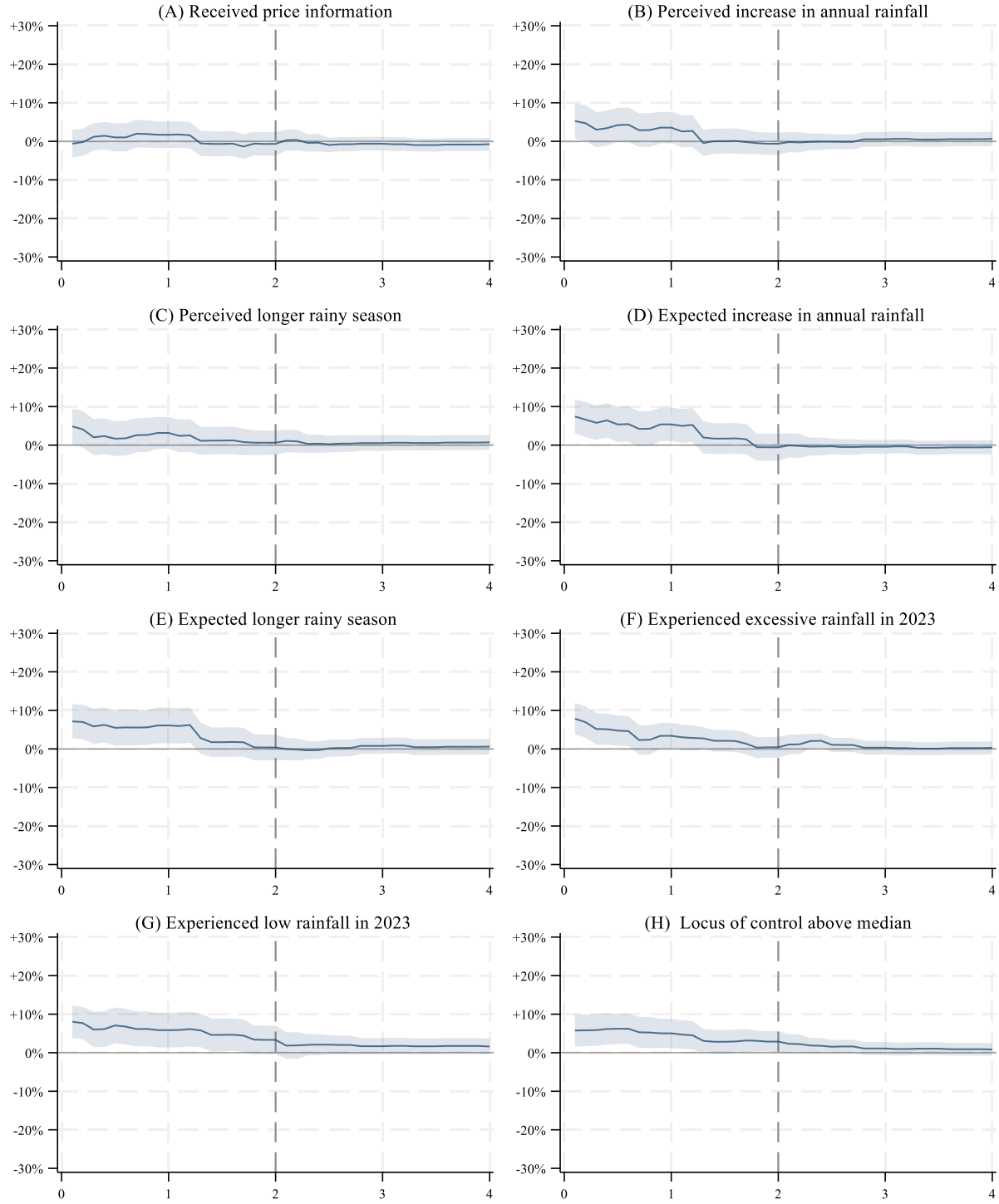


Notes: The figure displays, for each price p, the share of respondents whose stated WTP is at least p for a 30-day rainfall insurance policy covering one hectare, separately for the two groups defined by the binary correlate indicated in each panel title. The dashed vertical line indicates the market price (USD 2). Source: VRFPS (wave 1).

Figure 3 plots the difference in stated demand between the two groups defined by each correlate ($X_{hv,i}$ =1 minus $X_{hv,i} = 0$) at each price level, along with 95% confidence intervals.[18] Across all correlates, estimated differences remain within ±10 percentage points, and confidence intervals include zero for nearly all prices. Receiving information about the market price of the rainfall insurance product in the randomized survey experiment (panel A) does not shift the WTP distribution, suggesting that prior price information does not anchor stated valuations. Similarly, perceived increases in rainfall (panel B) or a longer rainy season over the past decade (panel C) are not associated with significant differences in stated demand. Expectations of future increases in rainfall (panel D) or a longer rainy season (panel E) are associated with slightly higher demand at prices below USD 1.2. Respondents who experienced excessive rainfall in the previous 12 months (panel F) report higher stated demand at prices up to USD 0.6. Those who recently experienced unusually low rainfall (panel G) exhibit higher stated demand at prices up to USD 1.7. Finally, respondents with above-median internal locus of control (panel H) exhibit slightly higher stated demand at prices up to USD 1.3.

[18] Following Hidrobo et al. (2022), we estimate these differences using regressions of the form in equation (1), separately for each price between USD 0.1 and USD 8 (in increments of USD 0.1). The dependent variable is an indicator variable equal to one if $WTP \geq p$ and $X_{hv,i}$ denotes an indicator variable for the respective subgroup.

Fig. 3: Differences in stated demand for rainfall insurance by pre-specified correlates

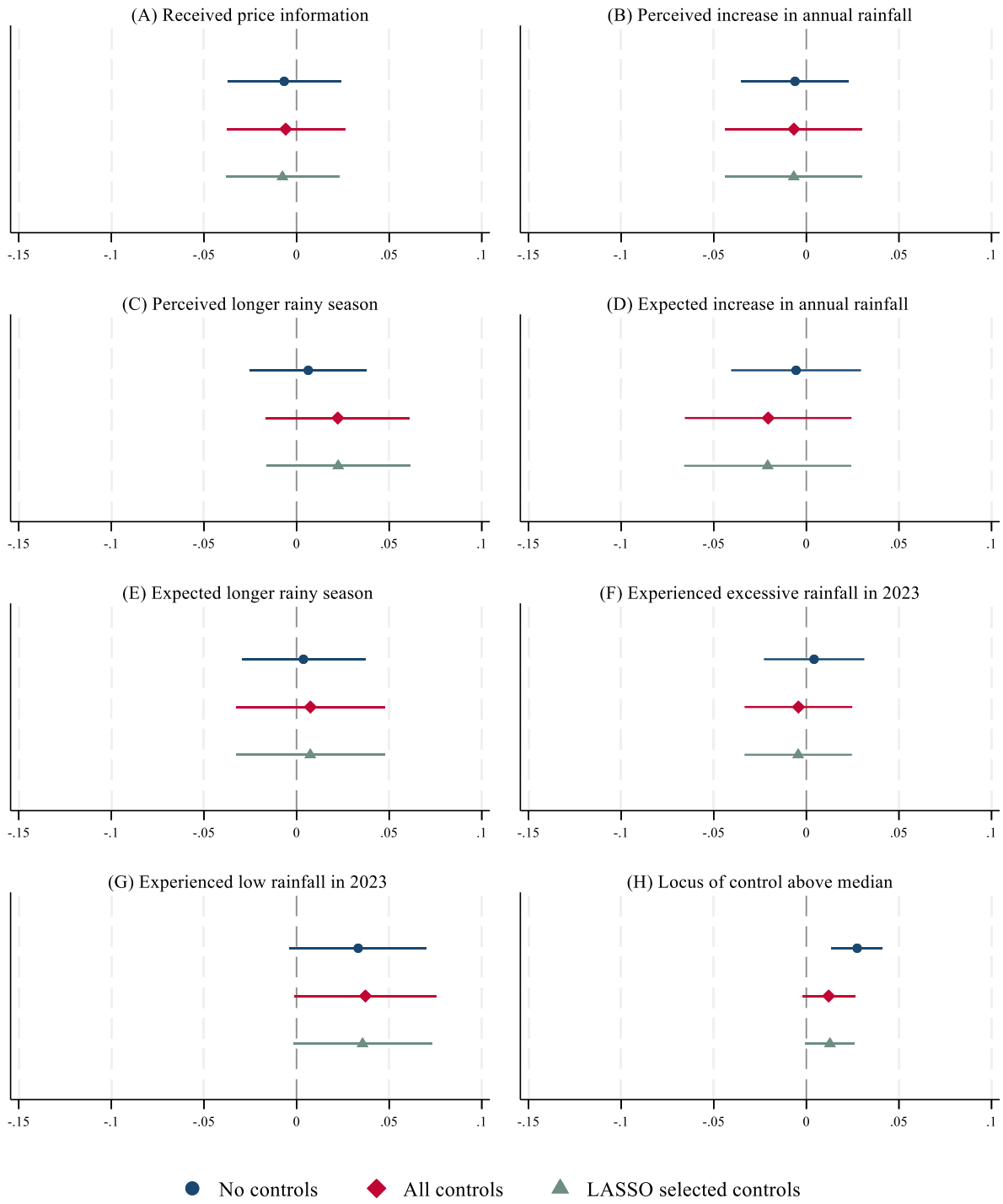


Notes: The figure displays, for each price p, the difference in the share of respondents whose stated WTP is at least p between the two groups defined by the binary correlate indicated in each panel title. The vertical axis displays the difference in the share of respondents between the two groups, and the horizontal axis the price (in USD) for a 30-day rainfall insurance policy covering one hectare. Shaded areas denote 95% confidence intervals. The dashed vertical line indicates the market price (USD 2). Source: VRFPS (wave 1).

Regression results displayed in Figure 4 confirm these patterns. The figure shows OLS estimates from regressions in which the dependent variable is an indicator equal to one if a respondent's WTP is at least USD 2 (the market price) on each of the eight correlates. We present estimates from three specifications: (i) bivariate regressions without controls, (ii) multivariate regressions including all controls, and (iii) regressions including controls selected via LASSO. Across specifications, point estimates are small (within ±0.04) and statistically indistinguishable from zero for nearly all correlates. The only exception is the bivariate association between locus of control and demand, which is statistically significant at the 5% level but disappears once additional controls are included.

The Appendix presents complementary results using alternative outcomes: continuous WTP (Figure A5), positive WTP (Figure A6), and WTP of at least USD 1 (Figure A7). Figure A5, panel G, suggests that recent exposure to exceptionally low rainfall is associated with an increase in WTP of approximately USD 0.1-0.2 across all three specifications. Figure A6 indicates that respondents who experienced either excessive rainfall (panel F) or exceptionally low rainfall (panel G) in the previous 12 months were more likely to report positive WTP. Figure A7 further shows that exposure to exceptionally low rainfall is associated with a higher probability of WTP of at least USD 1 (half the market price). Taken together, these robustness tests suggest that most pre-specified correlates have limited explanatory power for stated demand. The only robust pattern is that recent exposure to rainfall anomalies – particularly exceptionally low rainfall – is modestly associated with higher stated demand for rainfall insurance.

Fig. 4: OLS estimates for pre-specified correlates of stated demand at the market price ($WTP \geq USD\ 2$)



Notes: The figure displays OLS coefficient estimates and 95% confidence intervals for the pre-specified correlates. The dependent variable is an indicator equal to one if a respondent's stated WTP for a 30-day rainfall insurance policy covering one hectare is at least USD 2 (the market price). Blue circles denote estimates from bivariate regressions without additional controls, red diamonds denote estimates from multivariate regressions including the full set of controls, and green triangles denote estimates from regressions including controls selected using the LASSO procedure. Standard errors are clustered at the village level. The vertical dashed line indicates a coefficient of zero. Source: VRFPS (wave 1).

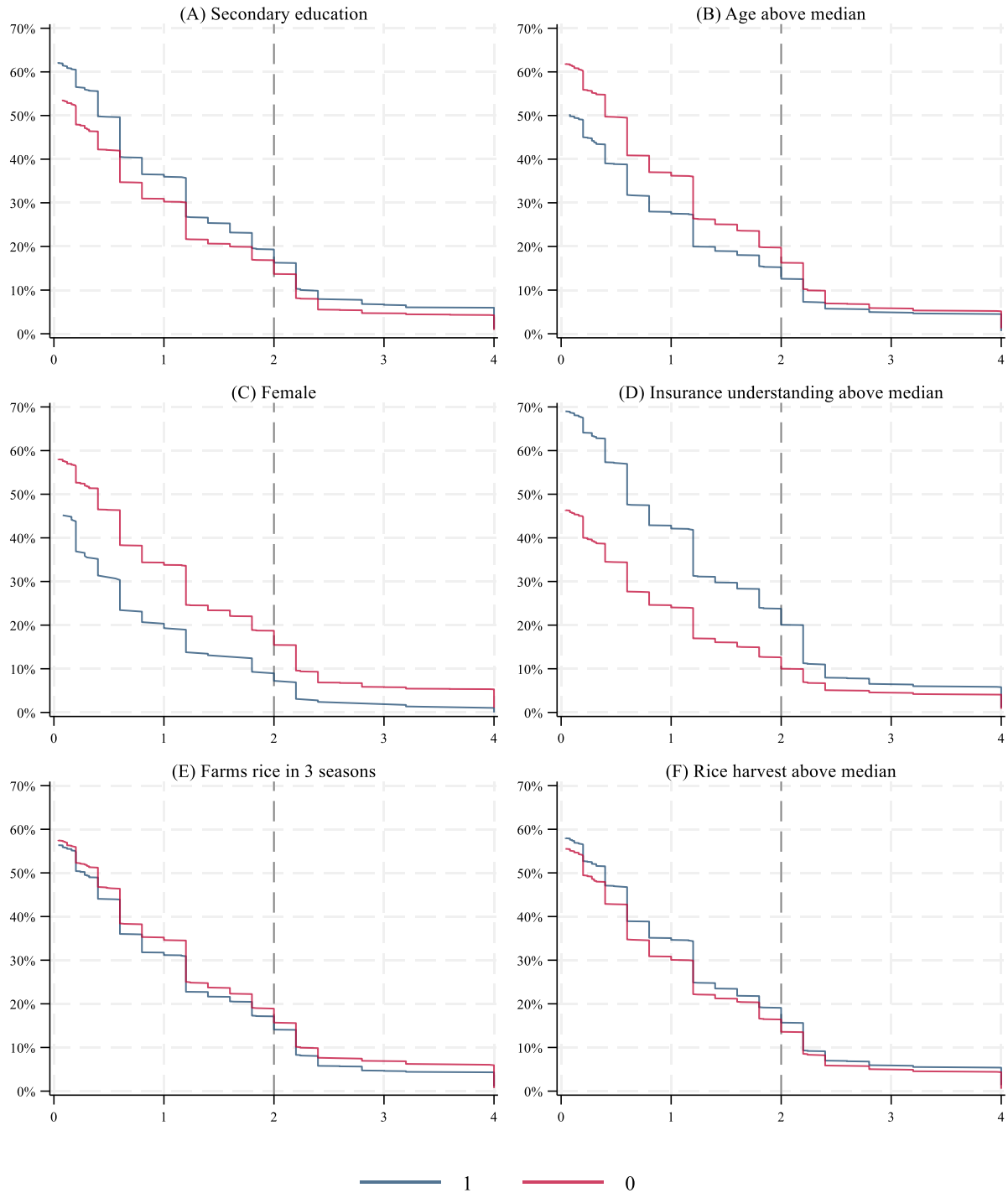
5.3 Heterogeneity in Additional Non-Pre-Specified Correlates

Figure 5 examines heterogeneity in stated demand for rainfall insurance across a set of additional, non-pre-specified correlates. Respondents with at least secondary education (panel A) exhibit higher stated demand at prices below USD 2. In contrast, older respondents (panel B) and women (panel C) exhibit lower stated demand, suggesting systematic differences across socio-demographic groups.

The inverse demand curve for respondents with above-median self-assessed product understanding lies consistently above that of respondents with below-median self-assessed product understanding, indicating higher stated demand at nearly every price (panel D). This association should be interpreted with caution, however, because product understanding was elicited after the WTP module and may therefore reflect ex post rationalization or consistency in respondents' stated valuations rather than a causal effect of understanding on demand.

Measures of agricultural engagement are not systematically associated with stated demand. Neither cultivating rice in all three growing seasons in 2023 (panel E) nor having an above-median rice harvest in 2023 (panel F) is systematically related to stated demand. Appendix Figures A8 and A9 present the corresponding regression estimates, which confirm the associations between age, gender, self-assessed product understanding, and stated demand.

Fig. 5: Inverse Demand Curves for Rainfall Insurance by additional non-pre-specified Correlates



Notes: The figure displays, for each price p, the share of respondents whose stated WTP is at least p for a 30-day rainfall insurance policy covering one hectare, separately for the two groups defined by the binary correlate indicated in each panel title. The dashed vertical line indicates the market price (USD 2). Source: VRFPS (wave 1).

6. Discussion: Contrasting Stated and Realized Demand

Despite being offered rainfall insurance at prices below their stated WTP and with subsidies up to 95% of the market price, none of the surveyed households redeemed the subsidy voucher to purchase a policy. Price is thus unlikely to explain the absence of purchases, consistent with reviews of the literature concluding that price alone cannot account for persistently low take-up (Cole 2015; Eling et al. 2014).

The discrepancy between substantial stated demand and zero realized purchases is consistent with several potential mechanisms. Our data do not allow us to distinguish conclusively among these explanations, and they are not mutually exclusive. We discuss three possibilities: potential overstatement of stated valuations due to limited incentive compatibility of the WTP elicitation mechanism, changes in valuations between elicitation and purchase opportunities, and contextual barriers that prevented stated demand from translating into realized purchases.

6.1 Limited Incentive Compatibility of WTP Elicitation

In previous field studies, BDM has been implemented using binding purchase decisions and immediate payment, resulting in few instances of non-compliance (Berry et al. 2020; Burchardi et al. 2021). However, enforcing such purchase decisions is often difficult because of ethical concerns, institutional limitations, and logistical challenges, which may undermine the incentive compatibility of the elicitation mechanism (Hoffmann 2018). For example, it may be problematic to enforce payment from poor or vulnerable study participants in LMICs if they do not fully understand that they are entering into a binding transaction.

Our study design used redeemable vouchers instead of binding spot transactions. While this approach avoided ethical and logistical challenges associated with enforcing immediate payment, it weakened incentive compatibility because voucher redemption remained voluntary. Respondents therefore had weaker incentives to reveal their true valuations. We find suggestive evidence that comprehension of the elicitation mechanism was related to stated valuations. More specifically, after completing the WTP elicitation, respondents were asked to self-assess their understanding of the WTP exercise on an 11-point Likert scale (Appendix Figure A10). Respondents with above-median self-assessed understanding of the WTP exercise also reported higher stated demand (Appendix Figure A11), suggesting that comprehension of the elicitation process is associated with reported valuations. This measure should nevertheless be interpreted with caution because it was recorded after the WTP exercise and may have been influenced by

the elicitation process.

6.2 Changes in Valuations between Elicitation and Purchase Decision

In ideal incentive-compatible WTP elicitation spot purchases are conducted immediately after WTP is elicited. In our case, however, respondents could redeem their premium subsidy vouchers only at a later date, creating a time gap between elicited valuations and the purchase opportunity. During this interval, respondents may have revised their valuations before making their purchase decision. Three mechanisms could account for such changes.

The first mechanism is declining salience. The WTP exercise was conducted at the end of the survey interview, after detailed questions about agriculture, income, and weather risks were asked. This sequence of survey modules may have heightened respondents' awareness of weather risks when WTP was elicited (Zwane et al. 2011). Respondents may have become less willing to purchase at their initially stated valuations once the salience of weather risk diminished.

The second mechanism is learning about the product. As respondents had more time to process information about the product, including through follow-up interactions with insurance agents, they may have reassessed their initial valuations. If learning were an important driver of valuation changes, one might expect respondents with more time before the agent visit to exhibit different purchase behavior. Yet, we do not find evidence that the length of the time gap affected insurance purchases. Even among households visited by insurance agents within three days of the survey, no household purchased a policy.

Beyond learning, a third mechanism is the timing of insurance coverage. Given the strong seasonality of rainfall, the perceived value of coverage may depend on when the insured period occurs. However, three findings suggest that this explanation is unlikely. First, stated demand for insurance does not differ between Can Tho province, where the survey occurred in May 2024, and the other three provinces, where the survey took place in January and February 2024 (Appendix Figure A12). Second, in all four survey provinces, vouchers were valid for periods in the second half of the year, when respondents perceived the rainfall risk to be highest (Appendix Figure A13). Third, Igloo's sales data show that rainfall insurance policies were purchased throughout the year, suggesting that demand for the product is not confined to a particular season.

Taken together, these patterns provide limited support for learning or the timing of insurance coverage as explanations for the gap between stated valuations and realized purchases. Instead, they are more consistent with the interpretation that the survey temporarily increased the salience of weather risk, with valuations reverting as that heightened salience faded. These tests are necessarily indirect, and the proposed mechanisms are not mutually exclusive.

6.3 Contextual Barriers to Insurance Adoption in Vietnam

A third explanation is that contextual features of Vietnam's rural economy limited insurance adoption. Trust in the insurance provider is one such barrier, and a recurring obstacle to insurance market development worldwide (Cole 2015). It may be particularly relevant in the context of this study. Limited exposure to private insurance and recent scandals in the life insurance sector may have contributed to limited trust in insurers (Lâm 2023).[19] Furthermore, Igloo was a relatively new market entrant without an established presence in rural areas at the time of the data collection.[20]

If trust in insurance providers is generally limited, why did many respondents still express a positive WTP for Igloo's rainfall insurance product? One possibility is that the survey context generated a higher level of trust than the subsequent sales interaction. Respondents may have been more willing to express positive valuations during an interview with enumerators than to purchase from unfamiliar agents contacting them later.

Additional barriers to insurance adoption may have been posed by broader social and structural features of Vietnam's rural economy. Qualitative observations during fieldwork suggested that adoption decisions for new financial or agricultural products are often embedded in local social structures. Cooperatives and village leaders can play an important role in validating external actors and innovations (Paik et al. 2020). Such local endorsements can facilitate adoption by increasing the perceived legitimacy of external actors and new products. In our study, insurance offers were made directly to individual survey households, bypassing these social channels. This approach – intended to give each survey household the opportunity to make an individual decision based on their preferences – may have reduced the perceived legitimacy of the product

[19] The 2022 life insurance mis-selling controversy involved allegations that some life insurance products were presented to customers as fixed-term savings products. The events received extensive national media coverage and were followed by increased regulatory scrutiny of the insurance sector (Duc Hieu et al. 2025).

[20] Survey evidence from Vietnam is consistent with this. In a choice experiment on flood insurance in Nghe An province, Reynaud et al. (2017) find that trust in the institution offering the policy predicts insurance choices, and that respondents report lower trust in private firms than in state-owned providers.

by introducing it outside established local channels.

7. Conclusion

This study examines stated and realized demand for a new parametric weather insurance product among rice farmers in Vietnam. Using a large household survey of more than 3,000 rice-farming households in the Mekong Delta, we elicit respondents' willingness to pay for insurance against losses from excessive rainfall. Respondents whose stated WTP exceeded a randomly determined price received a voucher that allowed them to purchase the product at a subsidized price.

The results indicate substantial stated demand for rainfall insurance. Approximately 33% of respondents reported a WTP of at least half the market price, and 18% reported a WTP at or above the market price. Stated demand varies systematically across some observable characteristics: older respondents and women report lower stated demand, while respondents with higher self-assessed understanding of the insurance product report higher stated demand. Among the pre-specified correlates examined, recent exposure to exceptionally low rainfall is the only characteristic consistently associated with higher stated demand, although the magnitude of this association is modest.

In contrast, none of the 1,375 households receiving a subsidy voucher purchased the insurance product, revealing a substantial discrepancy between stated demand and realized purchases. Even discounts of up to 95% of the market price did not induce any household to purchase the product. In general, this pattern is consistent with some earlier studies showing that lowering prices alone may be insufficient to stimulate demand (Cole et al. 2013). We discuss several mechanisms that may contribute to this discrepancy, including limited incentive compatibility of the WTP elicitation mechanism, changes in valuations between elicitation and purchase opportunities, and contextual barriers to insurance adoption. Our findings highlight that stated WTP obtained in survey settings does not necessarily translate into market demand, particularly for unfamiliar financial products where trust, distribution channels, and purchasing decisions outside the survey environment play an important role. The results underscore the importance of complementing stated preference measures with data on actual adoption when evaluating demand for new products and services in LMIC settings.

Appendix

Table A1: Vouchers values

Sum of dice	Probability for this sum of dice	Price offer (in VND)	Discount
2	3%	40,000	20%
3	6%	25,000	50%
4	8%	17,500	65%
5	11%	12,500	75%
6	14%	7,500	85%
7	17%	2,500	95%
8	14%	5,000	90%
9	11%	10,000	80%
10	8%	15,000	70%
11	6%	20,000	60%
12	3%	30,000	40%

Source: The authors.

Table A2: Sample size receiving vouchers

Subgroup	N
Respondents received a voucher	1,375
Respondents received phone call from insurance agent	914
Respondents agreed to have a home visit from insurance agent	324
Respondents received a visit from an insurance agent	185
Respondents purchased Igloo's rainfall insurance	0

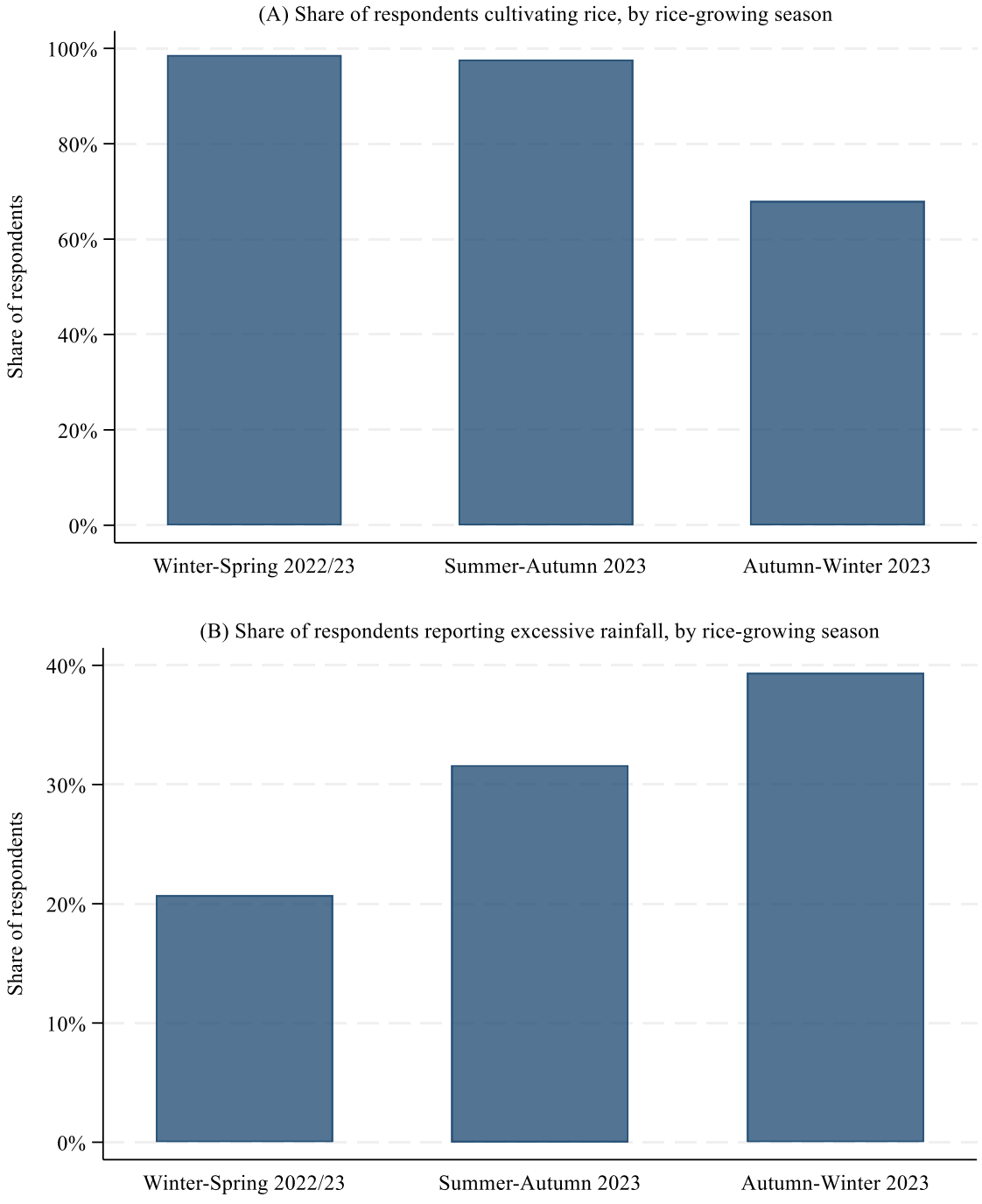
Source: VRFPS (wave 1).

Table A3: Balance test for the randomized information treatment on the market price of Igloo's insurance product

	Mean treatment group (N=1,449)	Mean control group (N=1,447)	P-value
Pre-specified correlates			
Climate perception: Perceived increase in annual rainfall in past 10 years (0-1)	0.35	0.34	0.61
Climate perception: Perceived longer rainy season in past 10 years (0-1)	0.32	0.33	0.52
Climate perception: Expected increase in annual rainfall in next 10 years (0-1)	0.29	0.27	0.48
Climate perception: Expected longer rainy season in next 10 years (0-1)	0.25	0.25	0.83
Experience with extreme events: Excessive rainfall in 2023 (0-1)	0.56	0.53	0.21
Experience with extreme events: Low rainfall in 2023 (0-1)	0.22	0.23	0.35
Locus of control (in std. dev.)	0.04	-0.02	0.07*
Additional correlates (not pre-specified)			
Female (0-1)	0.10	0.10	0.91
Age (in years)	53.75	53.76	0.98
Secondary or higher education (0-1)	0.36	0.37	0.49
Self-assessed understanding of rainfall insurance (0-10)	6.12	6.23	0.18
Household cultivated rice in 3 seasons in 2023 (0-1)	0.66	0.65	0.83
Household's average rice harvest per season in 2023 (in tons)	15.37	15.38	0.99
F-test of joint significance (P-value)			0.36

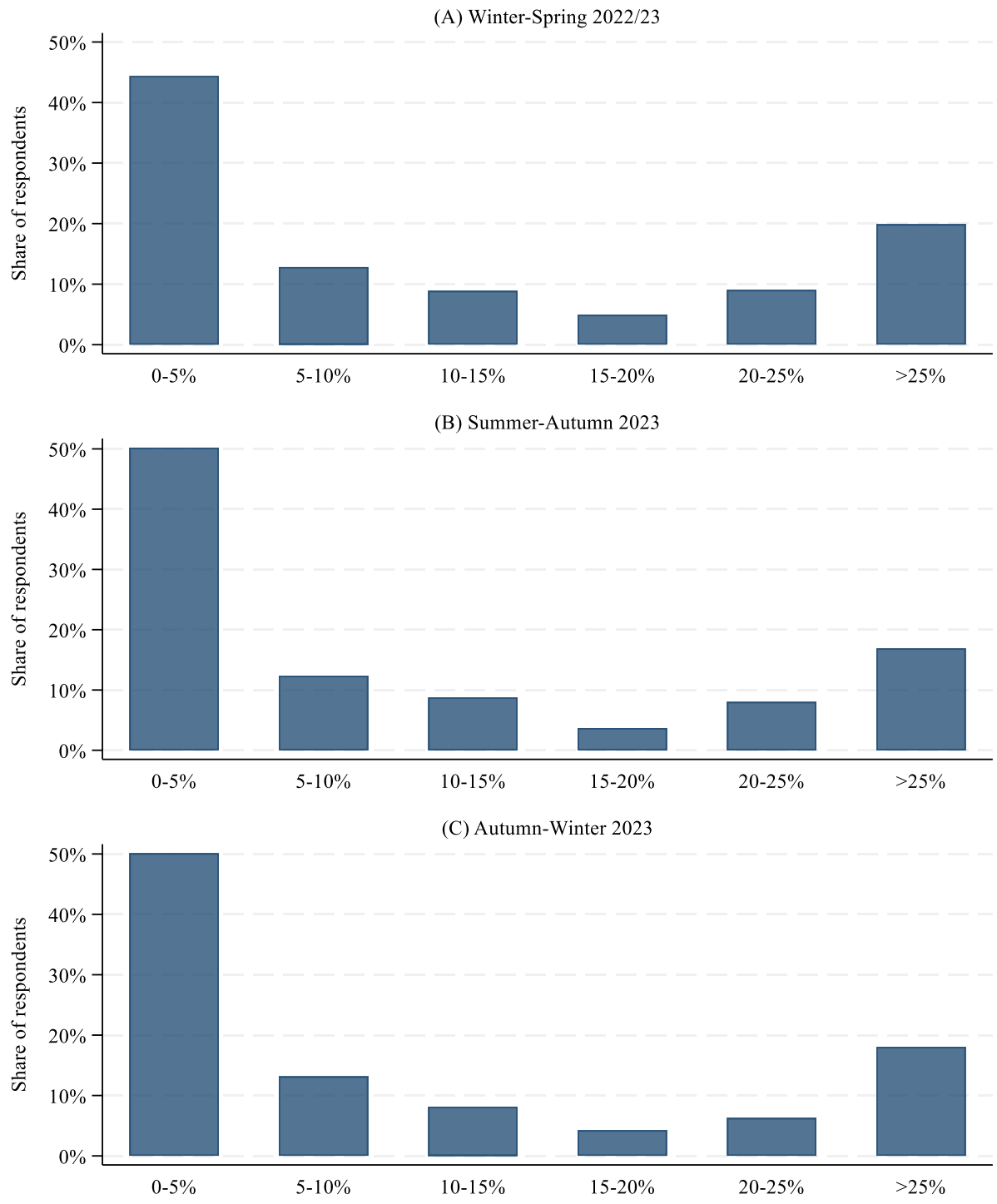
Notes: Randomization was conducted at the household level. Col. 3 displays p-values from separate OLS regressions of each correlate on an indicator for treatment, with standard errors clustered at the village level. The F-test of joint significance is based on 2,647 observations with non-missing data. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Source: VRFPS (wave 1).

Fig. A1: Share of households cultivating rice and reporting excessive rainfall in 2023, by rice-growing season



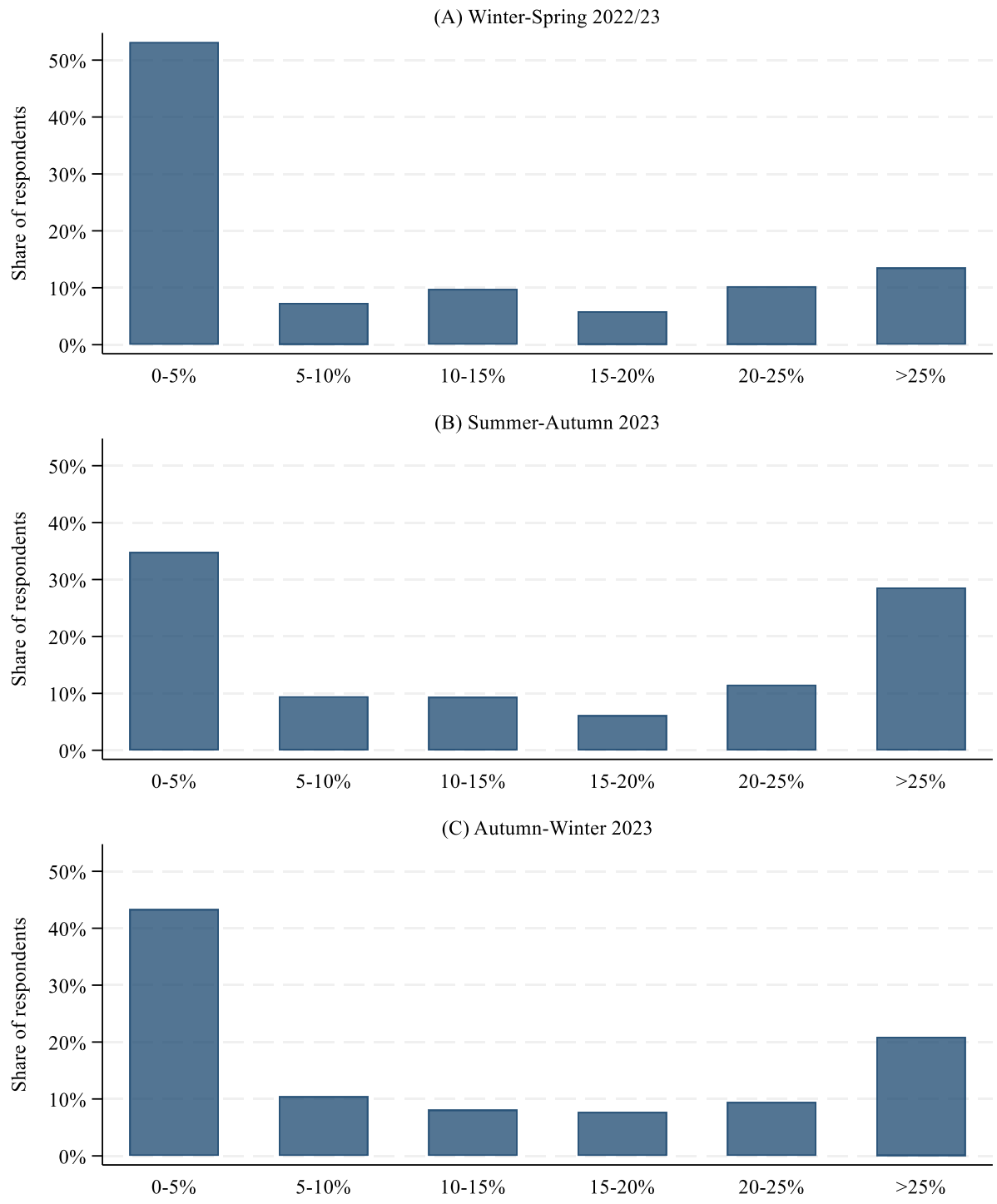
Note: Panel B is based on the subsample of households that cultivated rice in the corresponding season. Source: VRFPS (wave 1).

Fig. A2: Additional production costs due to excessive rainfall, by rice-growing season (conditional on experiencing excessive rainfall)



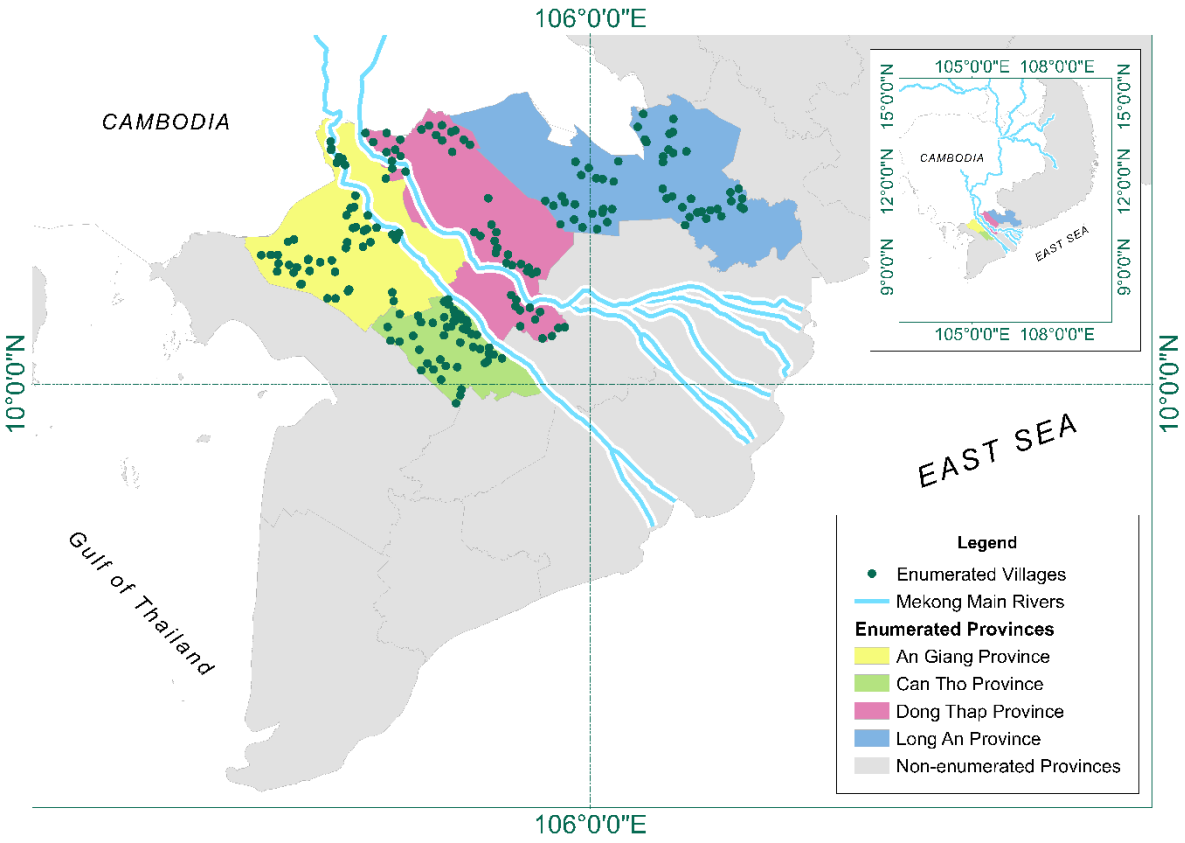
Note: The subsamples shown here consist of households that reported experiencing excessive rainfall in the corresponding season. Source: VRFPS (wave 1).

Fig. A3: Harvest losses due to excessive rainfall, by rice-growing season (conditional on experiencing excessive rainfall)



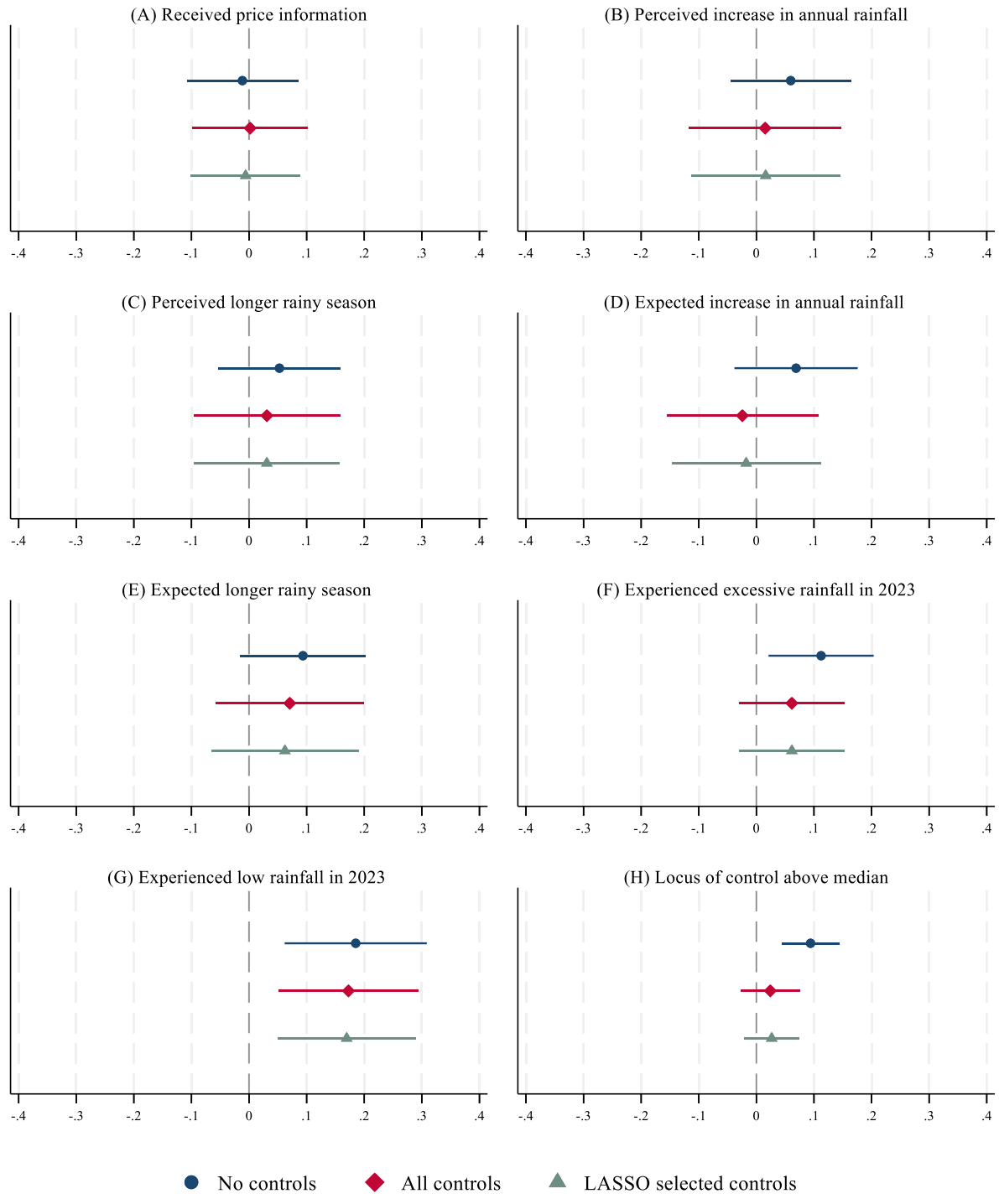
Note: The subsamples shown here consist of households that reported experiencing excessive rainfall in the corresponding season. Source: VRFPS (wave 1).

Fig. A4: Map of the survey area



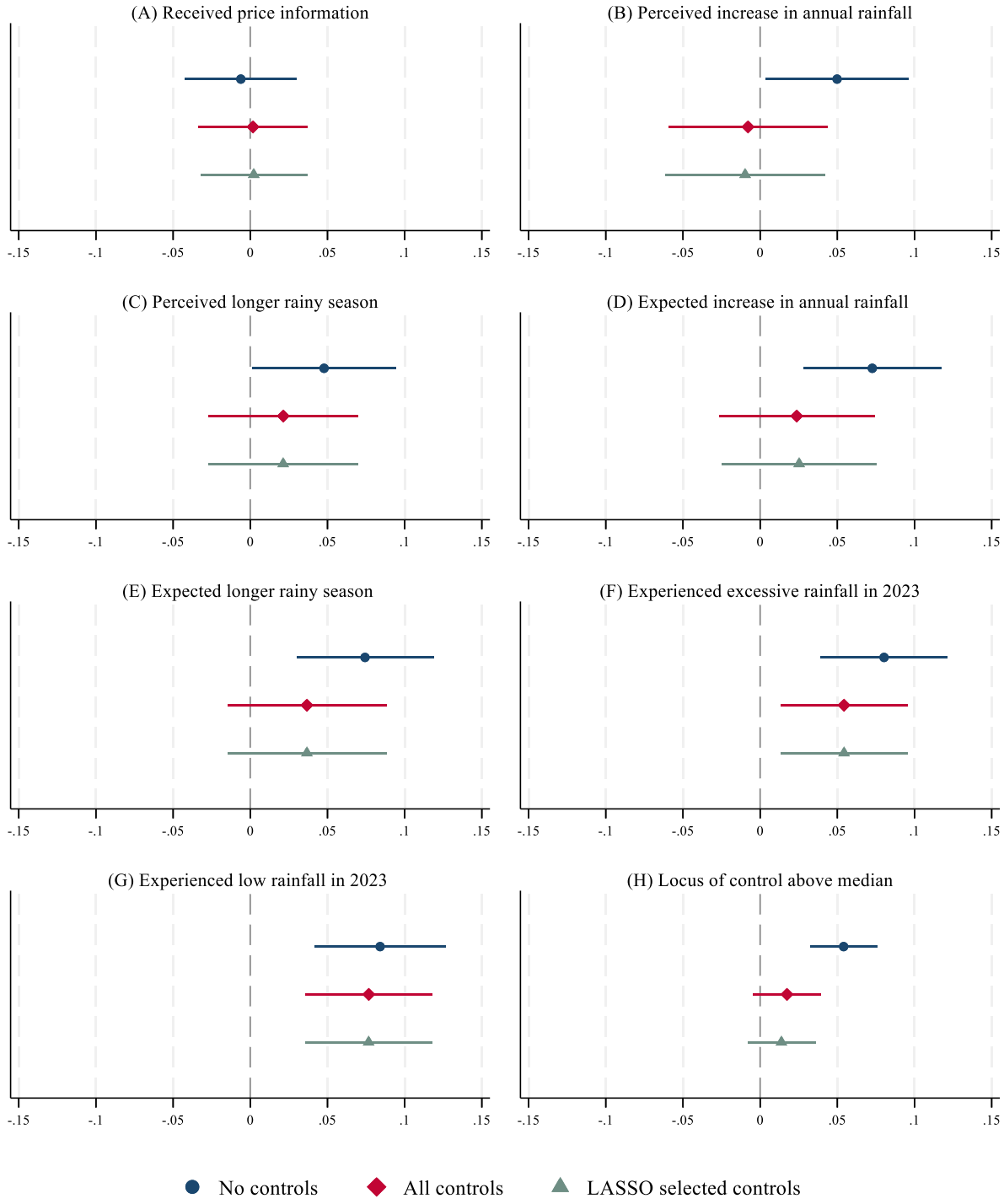
Source: Authors' own illustration.

Fig. A5: OLS estimates for pre-specified correlates of stated demand



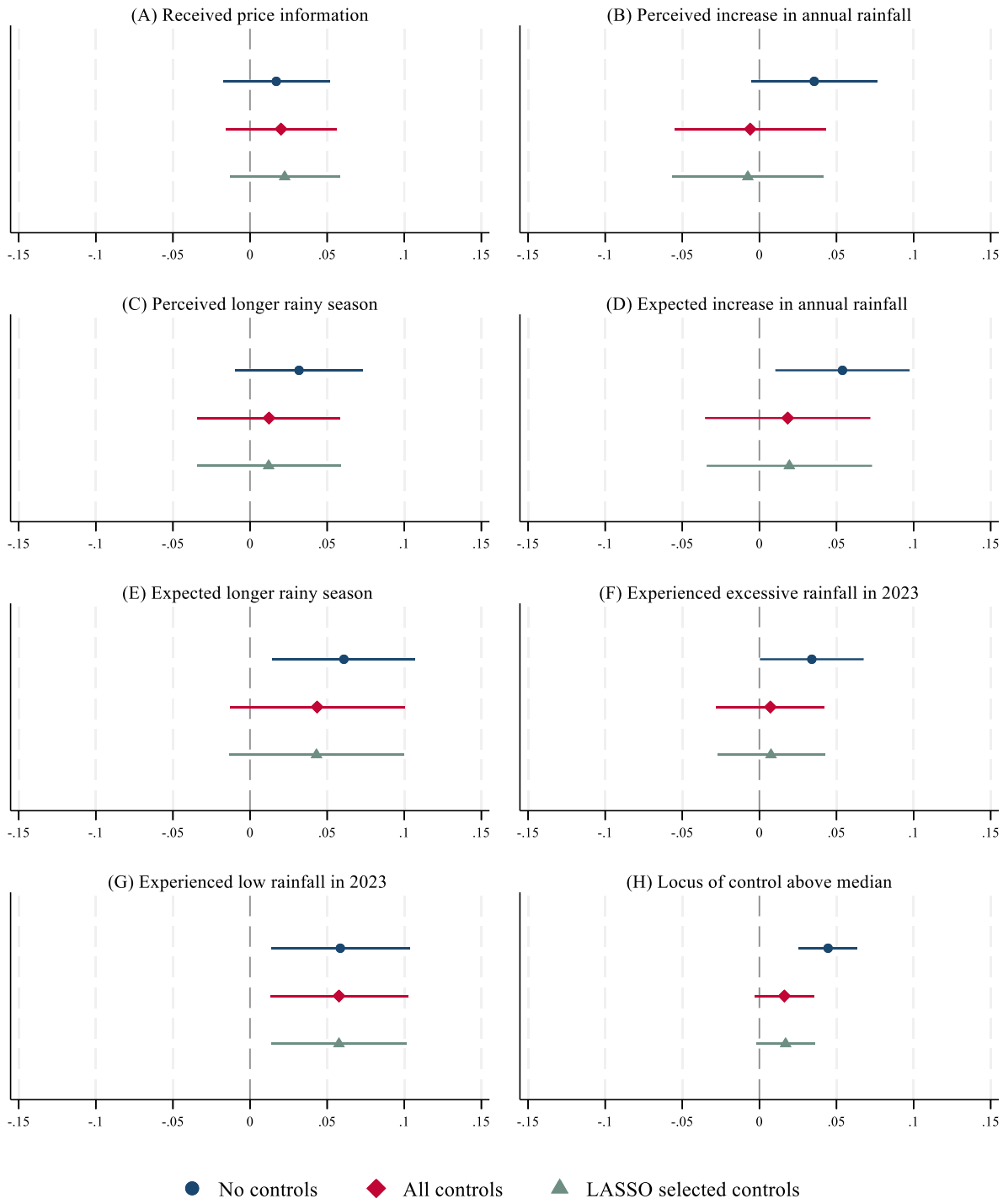
Notes: The figure displays OLS coefficient estimates and 95% confidence intervals for the pre-specified correlates. The dependent variable is respondents' stated WTP (in USD) for a 30-day rainfall insurance policy covering one hectare. Blue circles denote estimates from bivariate regressions without additional controls, red diamonds denote estimates from multivariate regressions including the full set of controls, and green triangles denote estimates from regressions including controls selected using the LASSO procedure. Standard errors are clustered at the village level. The vertical dashed line indicates a coefficient of zero. Source: VRFPS (wave 1).

Fig. A6: OLS estimates for pre-specified correlates of positive stated demand ($WTP > USD\ 0$)



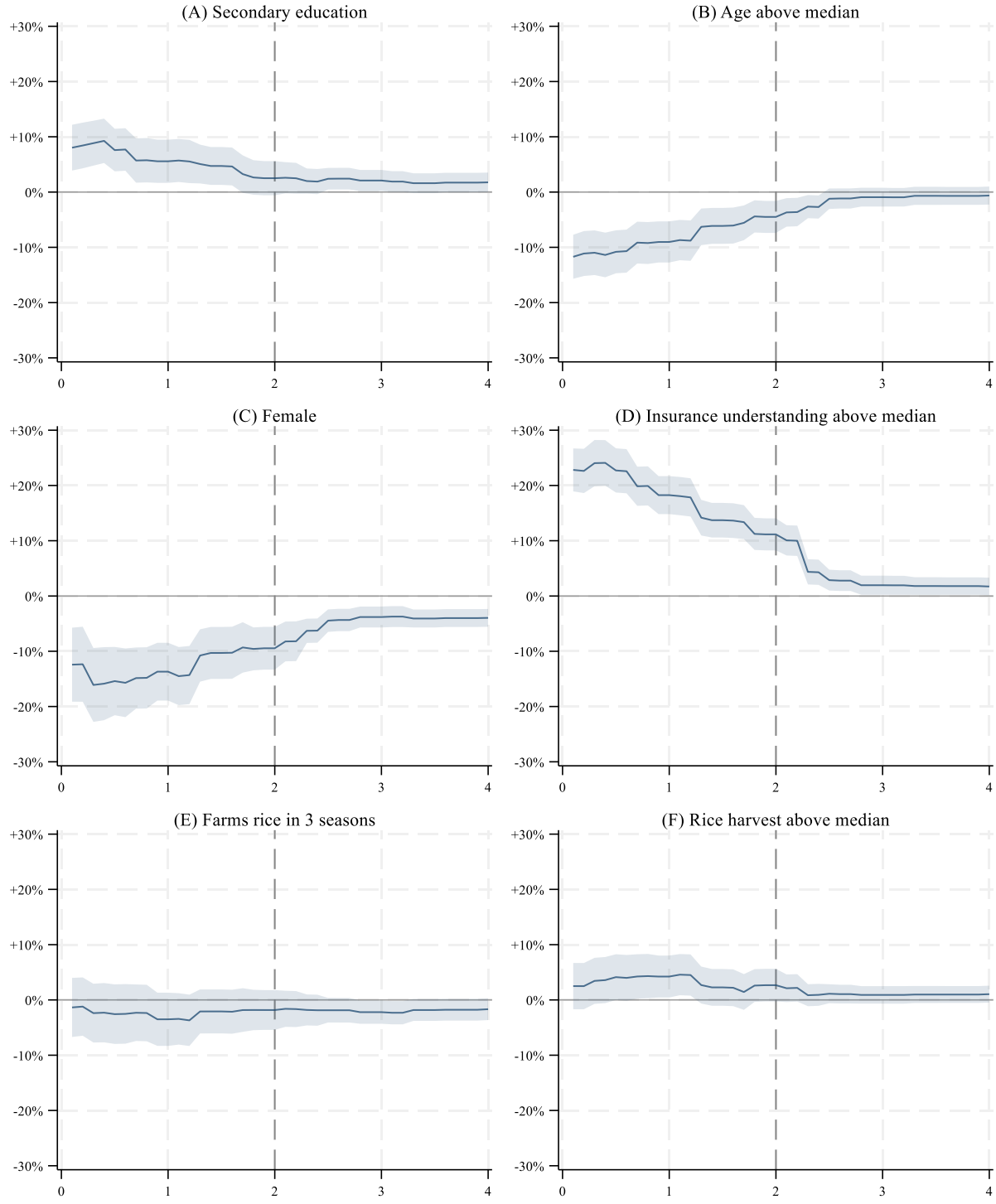
Notes: The figure displays OLS coefficient estimates and 95% confidence intervals for the pre-specified correlates. The dependent variable is an indicator equal to one if a respondent reports a positive stated WTP for a 30-day rainfall insurance policy covering one hectare. Blue circles denote estimates from bivariate regressions without additional controls, red diamonds denote estimates from multivariate regressions including the full set of controls, and green triangles denote estimates from regressions including controls selected using the LASSO procedure. Standard errors are clustered at the village level. The vertical dashed line indicates a coefficient of zero. Source: VRFPS (wave 1).

Fig. A7: OLS estimates for pre-specified correlates of stated demand at half the market price ($WTP \geq USD\ 1$)



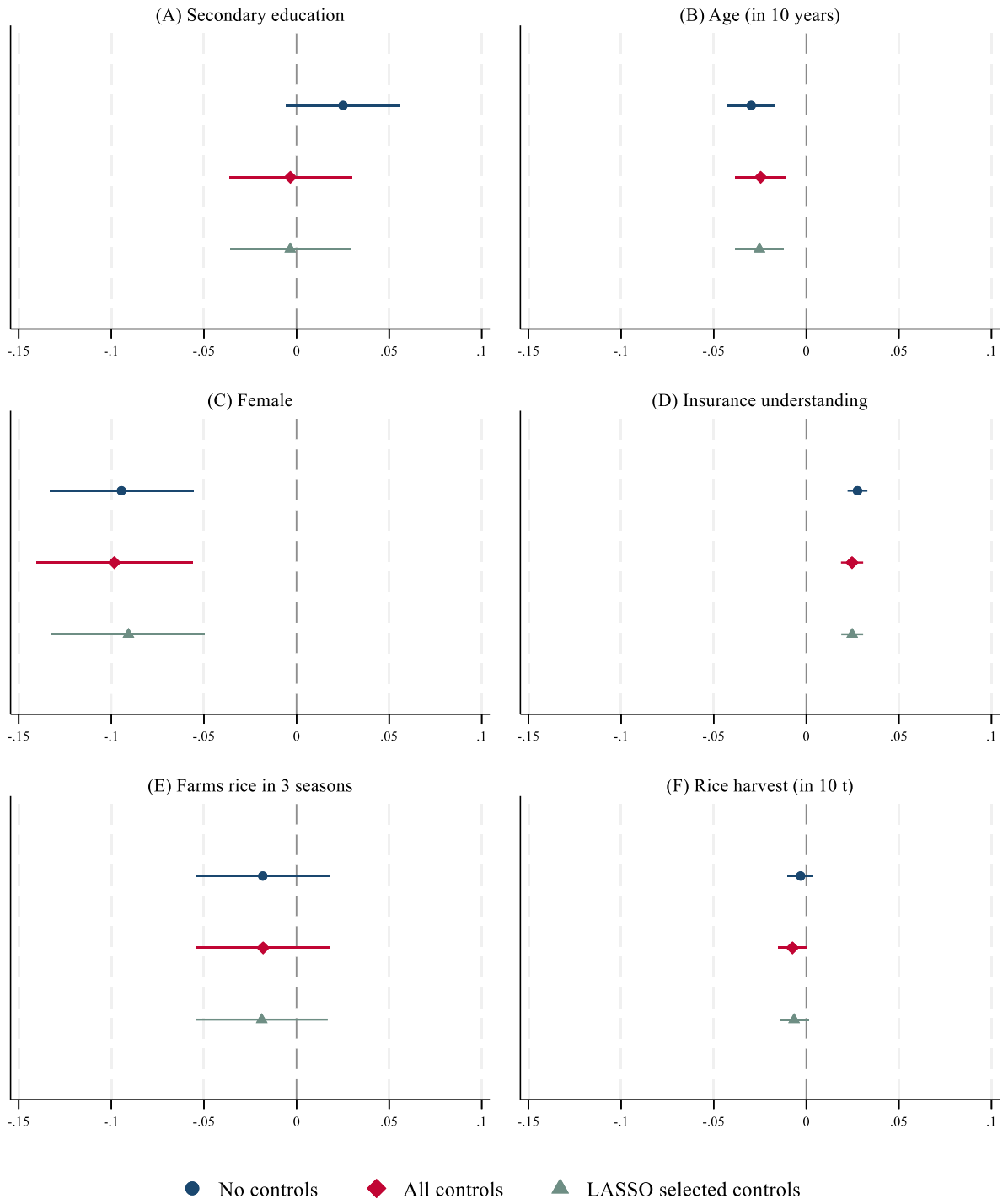
Notes: The figure displays OLS coefficient estimates and 95% confidence intervals for the eight pre-specified correlates. The dependent variable is an indicator equal to one if a respondent's stated WTP is at least USD 1 for a 30-day rainfall insurance policy covering one hectare. Blue circles denote estimates from bivariate regressions without additional controls, red diamonds denote estimates from multivariate regressions including the full set of controls, and green triangles denote estimates from regressions including controls selected using the LASSO procedure. Standard errors are clustered at the village level. The vertical dashed line indicates a coefficient of zero. Source: VRFPS (wave 1).

Fig. A8: Differences in stated demand for rainfall insurance by additional non-pre-specified correlates



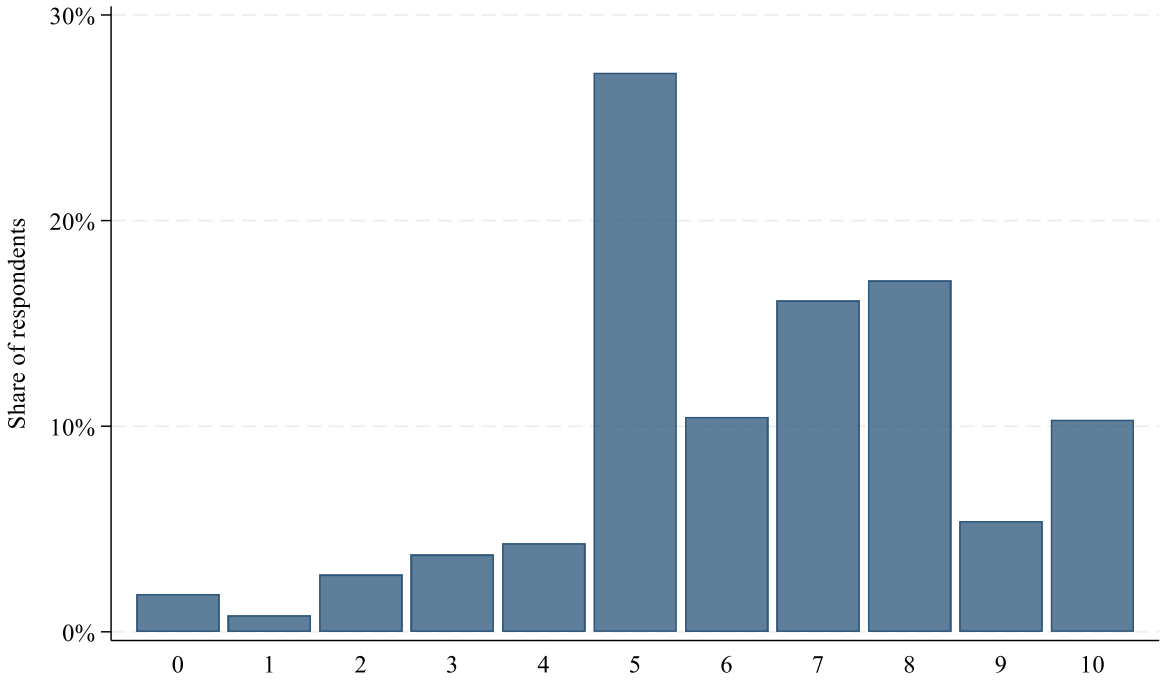
Notes: The figure displays, for each price p, the difference in the share of respondents whose stated WTP is at least p between the two groups defined by the binary correlate indicated in each panel title. The vertical axis displays the difference in the share of respondents between the two groups, and the horizontal axis the price (in USD) for a 30-day rainfall insurance policy covering one hectare. Shaded areas denote 95% confidence intervals. The dashed vertical line indicates the market price (USD 2). Source: VRFPS (wave 1).

Fig. A9: OLS estimates for additional non-pre-specified correlates of stated demand at the market price ($WTP \geq USD\ 2$)



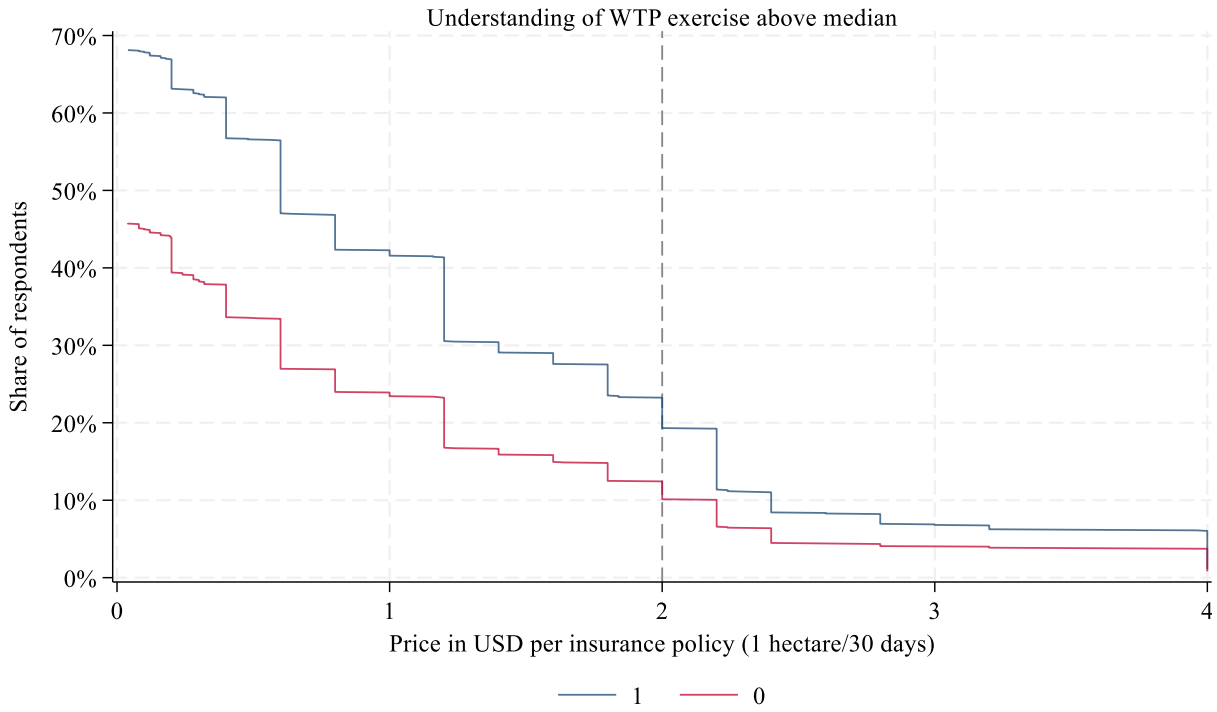
Notes: The figure displays OLS coefficient estimates and 95% confidence intervals for the additional non-pre-specified correlates. The dependent variable is an indicator equal to one if a respondent's stated WTP is at least USD 2 (the market price) for a 30-day rainfall insurance policy covering one hectare. Blue circles denote estimates from bivariate regressions without additional controls, red diamonds denote estimates from multivariate regressions including the full set of controls, and green triangles denote estimates from regressions including controls selected using the LASSO procedure. Standard errors are clustered at the village level. The vertical dashed line indicates a coefficient of zero. Source: VRFPS (wave 1).

Fig. A10: Self-assessed understanding of WTP exercise



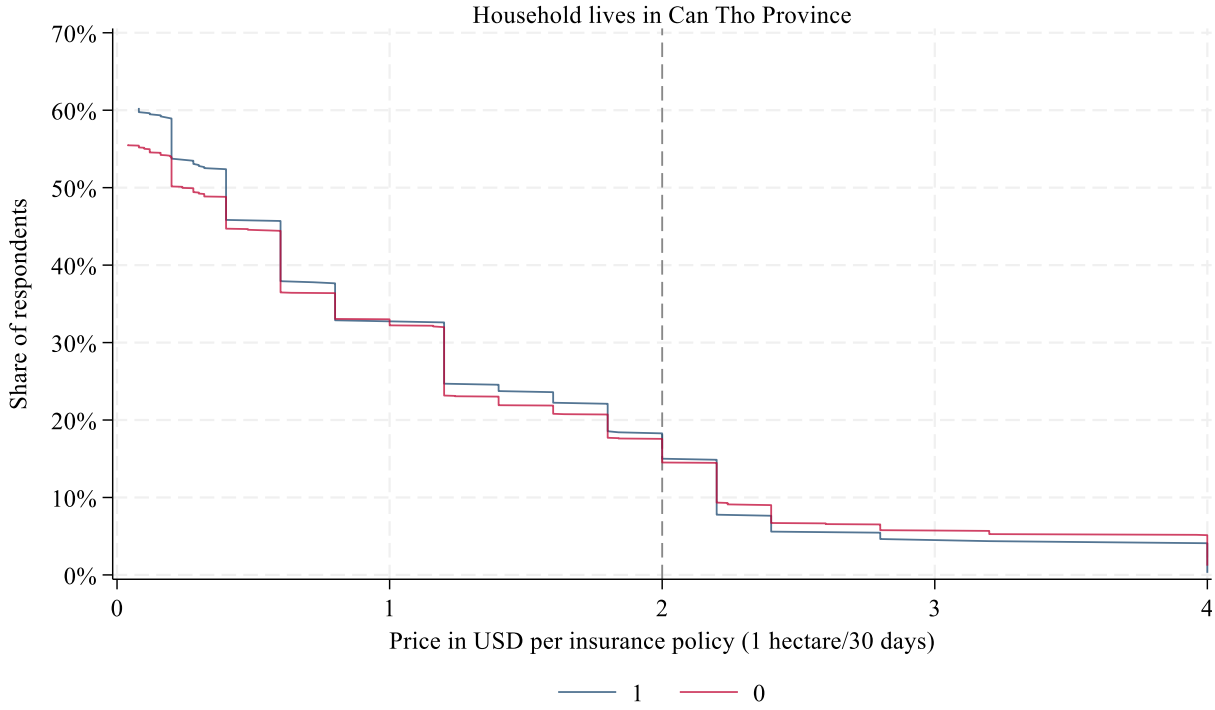
Notes: The survey item is as follows: "How easy or hard did you find this exercise? Please answer on a scale from 0 (do not understand it at all) to 10 (understand it very well)." Source: VRFPS (wave 1).

Fig. A11: Inverse demand curve for rainfall insurance by self-assessed understanding of WTP exercise



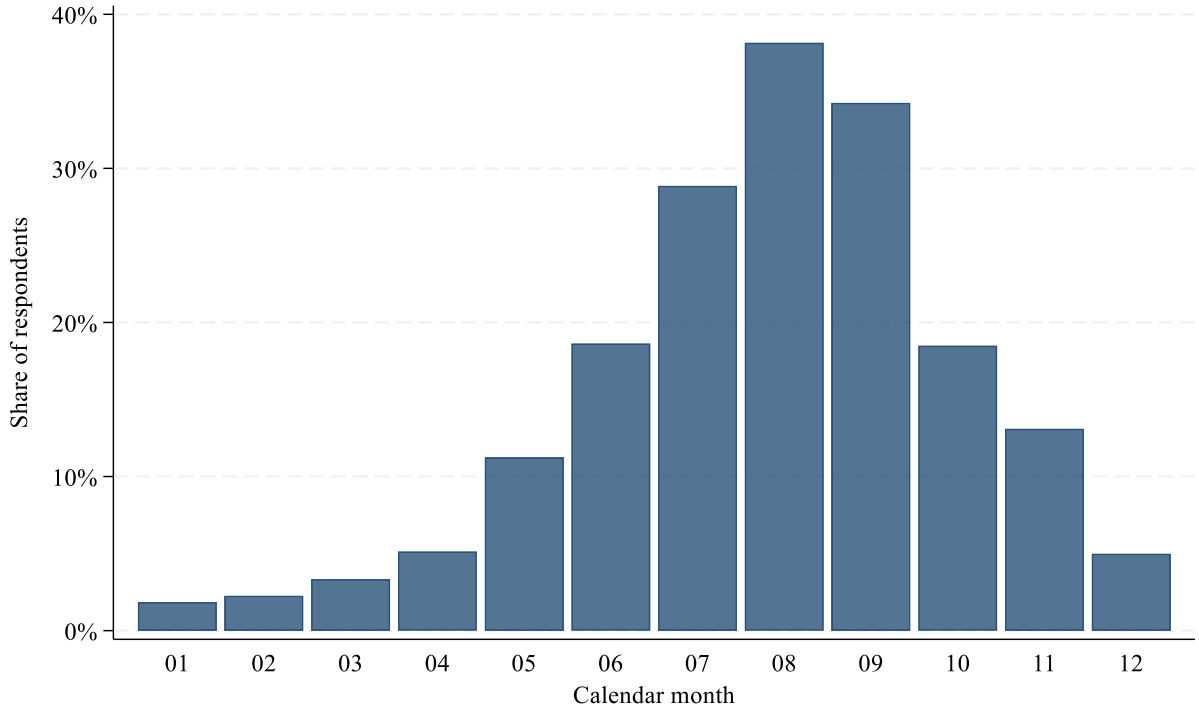
Notes: The figure displays, for each price p, the share of respondents whose stated WTP is at least p for a 30-day rainfall insurance policy covering one hectare, separately for respondents with above-median and below-median self-assessed understanding of the WTP exercise. The dashed vertical line indicates the market price (USD 2). Source: VRFPS (wave 1).

Fig. A12: Inverse demand curve for rainfall insurance by across provinces



Notes: The figure displays, for each price p, the share of respondents whose stated WTP is at least p for a 30-day rainfall insurance policy covering one hectare, separately for respondents living in Can Tho province and in the other three survey provinces. The dashed vertical line indicates the market price (USD 2). Source: VRFPS (wave 1).

Fig. A13: Seasonal pattern of concerns about excessive rainfall damaging rice crops



Notes: The figure shows the share of respondents who report being concerned that excessive rainfall could damage their rice crops in each calendar month. Source: VRFPS (wave 2).

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