Commitment against State Dependence: Experimental Evidence from Crop Insurance in Uganda

Lorenzo Casaburi[*] Jack Willis[†] Sili Zhang[‡]

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Abstract

Standard economic arguments suggest that state dependence is a reason to value flexibility. This paper shows that it can instead generate demand for commitment when individuals anticipate that future states will distort their decisions. A conceptual framework formalizes sophistication about distortions arising from two channels: state-dependent valuations (e.g., projection bias) and state-dependent decision mistakes (e.g., scarcity effects). We test its predictions in a field experiment in Uganda, where farmers can commit to purchasing *pay-at-harvest* crop insurance—a product that aligns the timing of payment and payouts, thereby removing the conventional present-bias mechanism for commitment. Forty percent of farmers commit to purchase the insurance for two seasons. An intervention increasing sophistication about future state dependence increases commitment demand by 11 percentage points. Additional evidence on state-contingent commitment suggests heterogeneity by proxies for both projection bias and scarcity, consistent with the two modeled channels. Our results have implications for welfare analysis and policy design, especially in environments with high state variability.

[*] Department of Economics, University of Zurich; lorenzo.casaburi@econ.uzh.ch.
[†] Department of Economics, Sciences Po; jack.willis@sciencespo.fr.
[‡] Department of Economics, LMU Munich; sili.zhang@econ.lmu.de.
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1. Introduction

In many economic decisions, individuals face choices that depend fundamentally on the state of the world—be it consumption in response to income fluctuations, health investments based on current health status, or reactions to environmental shocks and other personal circumstances. Standard economic arguments suggest that maintaining flexibility for such decisions is desirable because it enables one to best respond to whichever state is realized. As such, the option value arising from state dependence has long been proposed as an explanation for the *lack* of demand for commitment (e.g., Laibson, 2015).

This paper formalizes the hypothesis that *future* state dependence may be undesirable, and that it can generate demand for commitment when individuals anticipate that future states will distort their decisions. We then provide experimental evidence for the proposed mechanisms in a randomized controlled trial in which smallholder farmers in Uganda decide about crop insurance for two seasons. Consider the decision to purchase insurance in this setting. Individuals may undervalue future insurance when they experience a good state, e.g., due to projection bias (Loewenstein et al., 2003)—anticipating this tendency in the future may lead to a demand for commitment against making future decisions after good states. Alternatively, individuals may have impaired decision-making capacity in a bad state, e.g., due to the scarcity effect (Mullainathan and Shafir, 2013)—anticipating this tendency in the future may lead to a demand for commitment against making future decisions after bad states.

Isolating the role of state dependence in commitment demand requires removing the role of the leading canonical explanation—dynamically inconsistent intertemporal preferences (i.e., present bias, see Laibson, 1997; O'Donoghue and Rabin, 1999; Bryan et al., 2010). To do so, we study commitment in the purchase of *pay-at-harvest* crop insurance (Casaburi and Willis, 2018), a product that requires no upfront payment and aligns the timing of premiums and payouts, both of which occur at harvest. With this product, therefore, demand for commitment to purchase insurance in future seasons does not arise from concerns that the future self may prefer to use available liquidity for immediate consumption. In the experiment, farmers are offered pay-at-harvest insurance for two seasons and decide ex ante whether to commit to second-season coverage or retain flexibility. The insurance is provided by Uganda's largest agricultural insurance association through a crop buyer, which deducts premiums from farmers' harvest revenues at the end of each season.

We begin by formalizing the effects of anticipating undesirable future state dependence with respect to harvest realizations. We introduce two broad classes of undesirable state dependence while remaining agnostic about their micro-foundations: (i) *state-dependent valuations*, in which the future self's valuation of insurance is too anchored to the realized harvest, and (ii) *state-dependent decision quality*, in which the future self may make poorer decisions due to scarcity or financial stress. Both forces create a misalignment between the current self's and the future self's preferences over future insurance purchase decisions, for example, undervaluing insurance after a good harvest or making poorer decisions after a bad harvest.

We show that the expected net value of flexibility can then be decomposed into two components: an option value component, which results from standard desirable forces, and an anticipated distortion component, arising from the two forces described above. The framework yields the following main result: an intervention that increases sophistication about undesirable state dependence weakly increase farmers' demand for commitment, as the current self is made to realize the distortion arising from different future states. Specifically, farmers may choose state-contingent commitment—i.e., a commitment that binds after future good states, bad states, or both states—depending on which of the two undesirable channels are relevant for them.

Guided by our conceptual framework, we design an intervention aimed at increasing sophistication about undesirable state dependence and evaluate its effects on demand for commitment in a randomized controlled trial. Before insurance and commitment choices are elicited, treated farmers are prompted to mentally simulate key elements of decision-making for the subsequent seasons, including how good versus bad harvest experiences shape expectations, valuations of insurance, and decision quality. These simulations are then linked to simple, non-prescriptive evidence from prior research on state-dependent insurance demand and decision-making under financial stress, and finally to a balanced discussion of the trade-offs between flexibility and commitment. The intervention thus helps farmers think through how harvest states may shape future insurance decisions.[1] As part of the questions designed to assess whether the intervention shifted farmers' perceptions of how harvest states shape their insurance decisions (i.e., "manipulation checks"), farmers are then asked to judge the desirability of letting harvest states influence their insurance decisions, and to identify which states they consider more appropriate for making such decisions.

Initial analysis provides descriptive evidence of the forms of state dependence present in our setting and of demand for commitment. First, treated farmers' responses when thinking through good- and bad-harvest scenarios point to both types of state dependence highlighted in our framework. Farmers report valuing insurance significantly more after a bad season than after a good

[1] The intervention may increase sophistication about *current* state dependence as well as about *future* state dependence. However if the experiment affected only sophistication about current state dependence, it might change insurance demand but should not affect demand for commitment over future choices. We discuss this distinction in the presentation of the model and the empirical results.

season when answering these hypothetical scenarios ($p < 0.01$), which is consistent with state-dependent valuations likely driven by projection bias. They also report lower perceived decision-making quality after a bad season than after a good season ($p < 0.01$), in line with state-dependent decision-making likely driven by financial stress or scarcity.

Second, we document substantial demand for commitment in the control group. 78% of farmers signed up for pay-at-harvest insurance, a take-up rate comparable to Casaburi and Willis (2018). As farmers were offered the choice between maintaining flexibility for the second season or committing to purchase insurance for the second season, 40% opted for commitment. When asked to explain their choice, 60% of committed farmers gave explicitly preventive reasons, such as "preventing cancellation" or "avoiding regret", which is consistent with preventing undesirable state dependence and a non-trivial degree of sophistication. While our design minimizes many other reasons for commitment demand, the results of the control group do not yet explicitly demonstrate our proposed mechanism, i.e, commitment against undesirable future state-dependence. Therefore, we turn to our treatment variation.

The experimental intervention provides two main results. First, by increasing sophistication about future state-dependent valuation and state-dependent decision quality, the intervention indeed makes farmers consider state dependence as less desirable: In the manipulation-check question assessing whether "changing one's interest in insurance depending on the current season" is (un)desirable, treated farmers rate such state dependence as 0.29σ less desirable ($p < 0.05$). The intervention also sharpens farmers' judgments about the most appropriate state for deciding about insurance: the share viewing good and bad seasons as equally appropriate falls from 73% to 51% ($p < 0.05$). By contrast, the treatment does not significantly affect any of the other measured channels, including trust in insurance, self-reported ability to imagine counterfactual states or frequency of contingent thinking.

Second, the treatment increases the share of farmers choosing commitment by 11 percentage points, from a control mean of 40% ($p < 0.05$). Notably, the intervention has a small and non-significant impact on overall insurance uptake, ruling out several alternative explanations for the treatment effect on commitment, such as those that would have operated by enhancing valuation of the insurance or the experimenter demand effect.

In line with the conceptual framework, both forces of state dependence—state-dependent insurance valuation and decision-making quality—appear to contribute to the demand for commitment. In our experiment, we offer state-contingent commitment: in addition to deciding whether to commit, farmers can choose whether the commitment should be binding after a payout (proxy for a bad state), no payout (proxy for a good state), or in both harvest states. Our model predicts that farmers concerned about state-dependent valuations may prefer a commitment that binds after a good harvest, while retaining flexibility after a bad harvest. By contrast, farmers sophisticated about state-dependent decision quality may want commitment that binds in states in which they expect impaired decision-making capacity. Farmers concerned about both may want commitment in both states. In the control group, two-thirds of committed farmers choose commitment that binds in both states (26% of the control sample), consistent with being subject to both forms of state dependence. A third of committed farmers choose commitment for one state only: 12.5% of committed farmers (5% of the control sample) want commitment that binds only after a good state; 20% of committed farmers (8% of the control sample) want commitment that binds only after a bad state. This pattern points to meaningful heterogeneity in the concerns driving demand for commitment against making decisions in specific future states.

Treatment heterogeneity further supports the above interpretation and shows that farmers' primary concerns differ—leading them to demand different forms of state-contingent commitment. Specifically, farmers with higher pre-treatment projection bias, measured as in Zhang (2026) and used here as a proxy for state-dependent valuations, are relatively more likely to demand commitment that binds after a good harvest. In contrast, farmers with higher pre-treatment financial stress, measured as in Sergeyev et al. (2025) and used as a proxy for state-dependent decision quality, are more likely to demand commitment that binds after a bad harvest. Both state-specific patterns are qualitatively robust to generalized random forests (Athey et al., 2019), and we do not detect meaningful evidence of broader treatment-effect heterogeneity among the remaining baseline covariates. We also discuss other explanations, such as costly decision-making and the failure of contingent thinking, and show that none of these explanations can accommodate the full set of results without invoking some forms of state dependence.

Finally, commitment appears consequential and is not followed by regret for most farmers. Choosing commitment at baseline correlates with a higher renewal of insurance in the second season (+ 9 percentage points, $p < 0.01$, from a control mean of 89%). Endline responses further indicate that committed farmers are broadly satisfied with their choice: they report lower regret than non-committed insured farmers ($p < 0.01$), and 94% say they would not have preferred to retain the option to cancel. These patterns are consistent with the prevalent view in our sample that crop insurance is worthwhile: 97.3% of farmers expressed this view before the experiment. Given farmers' limited prior exposure to insurance, sustaining coverage may therefore generate meaningful gains.

We contribute to a large literature on commitment devices (e.g., Della Vigna and Malmendier, 2006; Sadoff et al., 2020; John, 2020; Carrera et al., 2022; Bryan et al., 2010; Ericson and Laibson, 2019; Schilbach, 2019) by providing field evidence that commitment demand can arise from sophistication about undesirable future state dependence. Crucially, with pay-at-harvest insurance, both premium payments and any payouts occur after harvest in each season, long after the take-up decision. As a result, demand for commitment cannot arise from conventional mechanisms associated with dynamically inconsistent intertemporal discounting, such as present bias, which would require the insurance's cost to come before its benefit. This paper thus adds to recent evidence on commitment and dynamic inconsistency in other domains, such as moral decisions (Saccardo and Serra-Garcia, 2023) and risky choices (Heimer et al., 2025). Our findings also complement evidence from controlled settings showing that intertemporal choice can be influenced by bounded rationality and perceptions even in the absence of direct temporal motivations (e.g., Imas et al., 2022; Enke et al., 2025; Zhang, 2026).[2] This focus responds to a broader agenda, emphasized for example in Breza and Kaur (2026), that sophistication need not be limited to present bias but can apply to many behavioral forces.[3]

We also connect to empirical work documenting the role of projection bias (e.g., Conlin et al., 2007; Busse et al., 2015; Chang et al., 2018) and cognitive frictions (e.g., Kaur et al., 2025; Carvalho et al., 2024; Handel et al., 2026) in important field decisions. While existing work shows that these forces affect choices, we study a distinct object: sophistication about these forces in the future. Additionally, we add to emerging evidence that light-touch interventions based on memory, imagination, and mental simulation can change economically relevant choices (see, e.g., Augenblick et al., 2023; Orkin et al., 2023; Ashraf et al., 2025; John and Orkin, 2022; Bordalo et al., 2025; Bernard et al., 2026), and provide one theoretical basis for these effects.

Lastly, we contribute to a large literature on the determinants of insurance demand. Crop insurance can generate substantial welfare gains in developing countries (Cole and Xiong, 2017; Castaing and Gazeaud, 2025), yet inducing and sustaining demand has repeatedly proven hard and remains a challenge for policy and the industry (Cai et al., 2020). Existing work emphasizes insurance demand's sensitivity to recent events (e.g., Gallagher, 2014; Cole et al., 2014; Karlan et al., 2014; Cai et al., 2020). We complement this literature by studying not only state dependence in insurance demand, but also farmers' sophistication about this behavior, and, correspondingly, the resulting potential for commitment devices to sustain insurance coverage.

[2] In controlled settings, Toussaert (2018) documents commitment demand with dynamically consistent preferences in support of the dual-self representation (Gul and Pesendorfer, 2001), and Dykstra (2025) documents that commitment demand can differ across payday cycles.

[3] Closest in spirit, Carney et al. (2022) document partial naivety about the endowment effect in collateralized loan choices; we bring a similar question to state-dependent valuations and decision quality in insurance choices, and show how sophistication about these forces can generate demand for commitment.

2. Conceptual Framework

We develop a simple model to demonstrate how *undesirable* state dependence can generate demand for commitment despite the option value of flexibility.[4] We do so in the context of our experimental setting, where a farmer decides whether to sign up for pay-at-harvest insurance for the next two agricultural seasons. The state in question is thus one of the most salient states of farmers' economic lives: the harvest. The key decision is whether, upfront, farmers choose to commit to insurance for the second season or to maintain flexibility to decide after observing the first season's harvest.

We begin by formalizing the classic option-value argument favoring flexibility. We then introduce two broad classes of channels through which future states may distort renewal decisions. First, *state-dependent valuations*, where the predicted valuation of insurance is too anchored by current states. Second, *state-dependent decision quality*, where the ability to make good choices is impaired in certain states.[5] We then define naivety and sophistication for each of these channels, and demonstrate that the perceived value of flexibility can be composed into an option value component and an anticipated distortion component. We show that increased sophistication about these distortions can induce more demand for commitment—a key prediction that we test in our experiment. Proofs are in Appendix E.

2.1. Basic Setup

Time and states. There are three time periods, $t \in \{0,1,2\}$, representing agricultural seasons, and there is no time discounting. Within each period, decisions are made before a state $s_t \in \{G,B\}$ is realized. States are independently and identically distributed with probabilities p_G and $p_B = 1-p_G$.[6] The history observed at the start of period t is denoted as h_t, with $h_0 = \emptyset$, $h_1 = (s_0)$, and $h_2 = (s_0, s_1)$. More generally, $h_{t+1} = (h_t, s_t)$.

Insurance. Insurance is available for periods 1 and 2. Let $I_t \in \{0,1\}$ indicate coverage in period t. Insurance is a transfer across harvest states, not across time, thereby removing the conventional payment-timing mechanism through which present bias can generate demand for commitment. The (ex post) value of insurance, net of the premium payment $\pi > 0$, depends on the realized state

[4] Commitment–flexibility trade-offs have been formalized in models of incomplete contracts (Aghion and Bolton, 1992), optimal delegation (Alonso and Matouschek, 2008), and consumption-saving with temptations (Amador et al., 2006). Also see Gul and Pesendorfer (2001) for decision theoretical work on menu choices.

[5] These two undesirable forces can be viewed as failure for formulating objectives and failure for optimization, respectively, as defined in Bernheim and Taubinsky (2018).

[6] To demonstrate our force cleanly, we assume away state serial correlations. In practice, the presence of such correlations would strengthen the argument for option value and push against commitment.

and potentially also the history:[7]

$$\Delta(s_t, h_t) \equiv u(I_t = 1; s_t, h_t) - \pi - u(I_t = 0; s_t, h_t). \quad (1)$$

We assume $\Delta(B, h_t) > 0 > \Delta(G, h_t)$ for every h_t (i.e., insurance is more valuable in a bad season). The expected value of period-2 insurance after history h_2 is therefore:

$$V(h_2) \equiv \mathbb{E}[\Delta(s_2, h_2) \mid h_2] = p_G \Delta(G, h_2) + p_B \Delta(B, h_2). \quad (2)$$

Decisions. State s_0 is realized before the experiment, and farmers do not make a decision in period $t = 0$. At the start of period 1, Self 1 chooses I_1. Conditional on $I_1 = 1$, Self 1 then chooses between committing to $I_2 = 1$ and retaining flexibility. Under flexibility, Self 2 chooses I_2 after observing s_1 and hence h_2.

Our framework could in principle allow a richer menu, including (i) a symmetric commitment option to *not* insure (commit to $I_2 = 0$) and (ii) renewal-stage decision of I_2 even when $I_1 = 0$. Both extensions operate through the same conceptual channel; since they are not part of our experiment, we focus on the cases that are relevant empirically.[8]

2.2. The Option Value of Flexibility

In the rational benchmark, Self 2 can condition the renewal decision on the richer history h_2, based on $V(h_2)$, while Self 1 must decide at history h_1 before s_1 is known, based on $\mathbb{E}_{h_2|h_1}[V(h_2)]$. The option value of flexibility can thus be defined as

$$OV^r(h_1) = \mathbb{E}_{h_2|h_1}[\max\{V(h_2), 0\}] - \max\{\mathbb{E}_{h_2|h_1}[V(h_2)], 0\} \geq 0 \quad (3)$$

The inequality follows from convexity of the maximum operator, and it is strict when observing h_2 can change the sign of the expected value of insurance. Thus, state dependence by itself favors flexibility. Self 1 will (weakly) prefer not to commit, thereby allowing Self 2 to decide on I_2.

2.3. Undesirable State Dependence

We next introduce two broad classes of forces of *undesirable* state dependence motivated by our empirical setting. While we formulate each channel with a specific example in mind, we remain agnostic about their microfoundations for our application since many of them may result in observationally similar predictions. We are also agnostic about the exact forces at play a priori, but

[7] For an example of why the benefit of insurance may depend on the history, farmers may have more wealth and hence less need for insurance after multiple good harvests. Alternatively, insurance may be more valuable after repeated bad harvests, when another shock risks further erosion of health or productive assets.

[8] In the experiment, we do not allow for (i) due to ethical concerns given underinsurance. We do not allow for (ii) because typical insurance products require continuous coverage, making "skip-then-enroll" an unnatural feature. More generally, limiting the menu reduces choice complexity, which is particularly important in our setting.

will later build diagnostic components into our experiment to examine their existence.

2.3.1. Channel 1: State-dependent valuations

We first introduce undesirable state dependence that operates through (predicted) *valuations*. We model state-dependent valuations following the formulation of projection bias (Loewenstein et al., 2003). Specifically, when forecasting the value of insurance for period t at time $\tau \le t$, a farmer with $\alpha \in [0,1]$ places weight on the value that insurance would have delivered in the most recently realized state when forecasting its value in a future period:

$$\tilde{\Delta}^t_\tau := \underbrace{\alpha\,\Delta(s_{\tau-1},h_{\tau-1})}_{\text{ex post value at }\tau} + \underbrace{(1-\alpha)\,\Delta(s_t,h_t)}_{\text{actual value at }t}. \tag{4}$$

This channel has been argued to contribute to under-insurance after a good season and/or over-insurance after a bad season in other settings (Kremer et al., 2019). For empirical evidence of projection bias in durable-goods consumption and health insurance, see Conlin et al. (2007), Busse et al. (2015), and Chang et al. (2018) among others. Note that, however, this formulation is intended to also capture a broad class of forces that can make valuation of insurance excessively anchored to the most recent harvest state, such as temptation, contextual cues, and so on.Conditional on a possible history h_2, Self 1's current evaluation of period-2 insurance is:

$$\mathbb{E}[\tilde{\Delta}^2_1 \mid h_2] = \alpha\,\Delta(s_0,\emptyset) + (1-\alpha)\,V(h_2). \tag{5}$$

Self 1's beliefs about how Self 2 will value period-2 insurance, and whether the resulting renewal-stage choice would depart from Self 1's own assessment, are central to the commitment decision. These beliefs are also directly targeted by our experiment.

Naivety and sophistication about state-dependent valuations. Let $\lambda_\alpha \in [0,1]$ capture Self 1's sophistication about *future* state-dependent valuations. Formally, Self 1 believes that Self 2's renewal-stage valuation places weight $\lambda_\alpha\alpha \in [0,\alpha]$ on $\Delta(s_1,h_1)$, the realized renewal state, and the remaining weight on Self 1's own first-order prediction $\mathbb{E}[\tilde{\Delta}^2_1 \mid h_2]$.

$$\widehat{\Delta}^2_2(\lambda_\alpha) = \lambda_\alpha\alpha\,\Delta(s_1,h_1) + (1-\lambda_\alpha\alpha)\mathbb{E}[\tilde{\Delta}^2_1 \mid h_2] \tag{6}$$

Under valuation naivety, $\lambda_\alpha = 0$, Self 1 expects Self 2 to use the same history-contingent assessment as Self 1. As λ_α increases, Self 1 increasingly anticipates that Self 2's valuation will be pulled toward the realized renewal state s_1, *relative to Self 1's current assessment.* For example, a good harvest pulls that valuation toward $\Delta(G,h_1) < 0$ and may therefore lead Self 2 not to renew insurance that Self 1 values positively.

Note that the parameter λ_α captures sophistication about the future tendency, not complete correction of Self 1's current bias. To see this, note that even at $\lambda_\alpha = 1$, the residual weight in equation (6) remains on Self 1's own assessment, which could be potentially distorted. To the extent that a farmer may also be sophisticated about current state dependence, this would show up as a reduced-form attenuation of the current α (e.g., see Kaufmann, 2022). Since our focus is on commitment—which depends on beliefs about how renewal-stage valuation will differ from today's assessment—it is the sophistication about the future tendency that is central for us, whereas sophistication about current state dependence primarily shifts the level of state dependence in valuations today.[9] Appendix D discusses this distinction, several conceptual subtleties, and how sophistication in this setup compares with sophistication in the canonical β–δ model.

2.3.2. Channel 2: State-dependent decision quality

We next introduce undesirable state dependence that operates through *decision quality*: the reliability with which a farmer implements the insurance decision based on his evaluation may itself depend on the harvest state. A motivating example is the scarcity effect, whereby decision quality is impaired by pressing financial stress or cognitive frictions (Mullainathan and Shafir, 2013; Carvalho et al., 2024; Kaur et al., 2025; Dean et al., 2017) especially after a poor harvest.

We model state-dependent decision quality as a default-anchored attention shock in the spirit of models of inattention (Gabaix, 2014; Carroll et al., 2009). In period $t \in \{1,2\}$, Self t evaluates insurance based on the perceived value $\mathbb{E}[\tilde{\Delta}_t^t]$. An attention shock $e_t \in [0,1]$ then pulls the contemporaneous decision toward a default of no insurance $d < 0$.[10] The period-t insurance decision therefore is based on

$$(1 - e_t) \cdot \mathbb{E}[\tilde{\Delta}_t^t] + e_t \cdot d, \qquad d < 0. \tag{7}$$

For simplicity, we assume that with probability $\varepsilon_{s_{t-1}}$ attention collapses fully ($e_t = 1$, defaulting to d), and otherwise the farmer acts on his evaluation ($e_t = 0$):

$$\Pr(e_t = 1 \mid s_{t-1}) = \varepsilon_{s_{t-1}}, \qquad \varepsilon_B > \varepsilon_G \geq 0. \tag{8}$$

We allow the realization of e_t to depend on the relevant harvest state. Motivated by empirical findings on scarcity, we assume the attention collapse is more likely in bad states. This is meant

[9] In the empirical section, we examine the possibility that an intervention designed to increase sophistication about future state dependence may also affect sophistication about the current tendency and hence the effective α.

[10] We assume that the decision-quality shock does not distort the evaluation of other objects. Because commitment is elicited only from enrollees, such a shock may prevent farmers with latent demand for commitment from reaching the commitment stage. Observed commitment is therefore a lower bound on the share who would choose it if all farmers reached that stage.

as the empirically more plausible benchmark in our setting: bad harvests make liquidity pressure, repayment concerns, and immediate consumption needs more salient, leaving less room for deliberation. The experiment later includes diagnostic measures that first verify whether farmers do view decision quality as state-dependent and, if so, in which direction.[11]

Naivety and sophistication about state-dependent decision quality. Central to Self 1's decision to commit is his belief about the reliability of Self 2's renewal-stage decision. We therefore introduce $\lambda_\varepsilon \in [0,1]$ to capture Self 1's sophistication about *future* state-dependent decision quality, scaling the probability that Self 1 anticipates Self 2 to default to no insurance.

Under decision-quality naivety, $\lambda_\varepsilon = 0$, Self 1 expects Self 2 to act on his renewal-stage evaluation reliably. As λ_ε increases, Self 1 increasingly anticipates that Self 2's renewal-stage attention may collapse. Conditional on h_2, Self 1 therefore assigns probability

$$(1-\lambda_\varepsilon \varepsilon_{s_1})\mathbf{1}\{\widehat{\Delta}_2^2(\lambda_\alpha) > 0\} \tag{9}$$

to Self 2 purchasing insurance under flexibility, where $\widehat{\Delta}_2^2(\lambda_\alpha)$ is Self 1's belief about Self 2's renewal-stage evaluation absent decision failures (as defined previously).

2.4. Commitment vs. Flexibility

Combining the two channels, the perceived value of flexibility relative to committing to $I_2 = 1$ is

$$\widetilde{OV}(h_1;\lambda_\alpha,\lambda_\varepsilon) = \mathbb{E}_{h_2|h_1}\left[\underbrace{\mathbb{E}[\tilde{\Delta}_1^2 \mid h_2]\,\mathbf{1}\{\widehat{\Delta}_2^2(\lambda_\alpha) > 0\}}_{\alpha\text{: misaligned valuation}}\ \underbrace{(1-\lambda_\varepsilon \varepsilon_{s_1})}_{\varepsilon\text{: quality shock}}\right] - \mathbb{E}_{h_2|h_1}\big[\mathbb{E}[\tilde{\Delta}_1^2 \mid h_2]\big] \tag{10}$$

This perceived option value now balances two potential forces. As before, there is an informational advantage of making the decision in period 2 because Self 2's decision can depend on h_2. However, two undesirable forces arise: Self 2 is now basing that decision upon $\widehat{\Delta}_2^2$ rather than $\tilde{\Delta}_1^2$ (and so may not purchase when Self 1 would have wanted to, or vice versa); and Self 2 may default to no insurance when stressed with state-dependent probability $\lambda_\varepsilon \varepsilon_{s_{t-1}}$.

To see the trade-off more clearly, note that $\widetilde{OV}(h_1;\lambda_\alpha,\lambda_\varepsilon)$ can be decomposed as follows:

$$\widetilde{OV}(h_1;\lambda_\alpha,\lambda_\varepsilon) = OV^\alpha(h_1) - D(h_1;\lambda_\alpha,\lambda_\varepsilon), \tag{11}$$

where

$$OV^\alpha(h_1) \equiv \mathbb{E}_{h_2|h_1}\big[\max\{\mathbb{E}[\tilde{\Delta}_1^2 \mid h_2], 0\}\big] - \mathbb{E}[\tilde{\Delta}_1^2 \mid h_1] \geq 0 \tag{12}$$

[11] For example, the opposite pattern is certainly possible in principle (e.g., see Fehr et al., 2022).

is the value of a history-contingent choice under Self 1's assessment, and

$$D(h_1;\lambda_\alpha,\lambda_\varepsilon) \equiv \mathbb{E}_{h_2|h_1}\Big[\max\{\mathbb{E}[\tilde{\Delta}_1^2 \mid h_2],0\} - \mathbb{E}[\tilde{\Delta}_1^2 \mid h_2](1-\lambda_\varepsilon \varepsilon_{s_1})\mathbf{1}\{\widehat{\Delta}_2^2(\lambda_\alpha) > 0\}\Big] \geq 0 \tag{13}$$

is the loss from disagreement or decision failure relative to Self 1's preferred history-contingent choice. A farmer chooses commitment if the anticipated distortion in Self 2's decision relevant to Self 1's, $D(h_1;\lambda_\alpha,\lambda_\varepsilon)$, is greater than Self 1's perceived value of flexibility with no anticipated distortion, $OV^\alpha(h_1)$.

2.4.1. Full commitment

We first consider the decision about full commitment. Our main result aims to establish that the perceived value of flexibility falls in both dimensions of sophistication. As we will find out later, for valuation sophistication λ_α this holds unconditionally. For decision-quality sophistication λ_ε, however, the two channels interact: increasing λ_ε makes Self 1 expect more purchases to be prevented by decision failures. This reduces the value of flexibility when Self 1 prefers the renewal, but increases the value of flexibility when the failures prevent purchases Self 1 would not want in the first place—greater decision quality sophistication reduces the value of flexibility only if the former force dominates. The following condition bounds this interaction.

Bounding over-purchase on average. For a given h_1, suppose

$$\mathbb{E}_{h_2|h_1}\big[\varepsilon_{s_1}\mathbb{E}[\tilde{\Delta}_1^2 \mid h_2]\mathbf{1}\{\widehat{\Delta}_2^2(1) > 0\}\big] \geq 0. \tag{14}$$

Condition (14) restricts attention to purchases susceptible to the decision-quality shock, weights each by its susceptibility ε_{s_1}. It requires that, after averaging across histories, the expected value of purchases Self 1 wants to preserve weakly exceeds the expected loss from purchases Self 1 wants to prevent, which is less restrictive in settings with underinsurance. It is sufficient to evaluate the condition at $\lambda_\alpha = 1$, where the interaction between the two forces is the strongest.

Proposition 1 (Full commitment and sophistication)**.** *For every history h_1:*

(i) *Under full naivety, $(\lambda_\alpha,\lambda_\varepsilon) = (0,0)$, $D(h_1;0,0) = 0$ and $\widetilde{OV}(h_1;0,0) = OV^\alpha(h_1) \geq 0$; Self 1 perceives no distortion from state dependence, therefore weakly prefers flexibility.*

(ii) *For every fixed $\lambda_\varepsilon \in [0,1]$, the perceived value of flexibility is weakly decreasing in valuation sophistication λ_α.*

(iii) *Under condition (14), for every fixed $\lambda_\alpha \in [0,1]$, the perceived value of flexibility is weakly decreasing in decision-quality sophistication λ_ε.*

Proposition 1 states that under full naivety Self 1 expects Self 2 to behave exactly as Self 1 would, so commitment carries no benefit relative to flexibility. Greater valuation sophistication can only reveal additional disagreement between Self 1 and Self 2 hence increases the demand for commitment. Greater decision-quality sophistication also lowers the value of flexibility when the purchases prevented by decision failures are preferred by Self 1 on average—precisely what condition (14) guarantees.

2.4.2. State-contingent commitment

We next consider the decision about *state-contingent* commitment. Namely, Self 1 can commit to insurance only following a specified realization of s_1, thus maintaining flexibility in the other state. Conditional on a realized history $h_2 = (h_1, s_1)$, the perceived value of flexibility relative to committing in that state is therefore:

$$\widetilde{OV}^{s_1}(h_1; \lambda_\alpha, \lambda_\varepsilon) = \mathbb{E}\left[\tilde{\Delta}_1^2 \mid h_2\right] \cdot \left[(1 - \lambda_\varepsilon \varepsilon_{s_1}) \mathbf{1}\left\{\widehat{\Delta}_2^2(\lambda_\alpha) > 0\right\} - 1\right]. \tag{15}$$

As before, Self 1 will choose to commit themselves against deciding about insurance in state s_1 if $\widetilde{OV}^{s_1}(h_1; \lambda_\alpha, \lambda_\varepsilon) < 0$.[12] Importantly for our empirical tests, sophistication about the two forms of state dependence affects demand for state-contingent commitment differently by state. Before stating the result, we introduce another condition that bounds the potential interaction between the two channels needed in this case, for similar reasons discussed above.

Bounding over-purchase statewise.

$$\mathbb{E}[\tilde{\Delta}_1^2 \mid h_2] \mathbf{1}\{\widehat{\Delta}_2^2(1) > 0\} \geq 0, \text{for each } s_1 \in \{G, B\} \text{ and corresponding } h_2 = (h_1, s_1) \tag{16}$$

The statewise condition states that any renewal anticipated at $\lambda_\alpha = 1$ must have non-negative value under Self 1's assessment. The condition rules out anticipated *over-purchase*, but permits Self 1 to value insurance while anticipating that Self 2 will not buy it.[13]

Proposition 2 (State-contingent commitment)**.** *Suppose condition* (16) *holds.*

(i) *For every fixed $\lambda_\varepsilon \in [0, 1]$, valuation sophistication λ_α weakly decreases the perceived value of flexibility after a good state and leaves it unchanged after a bad state. Thus, λ_α selectively increases demand for commitment that binds after $s_1 = G$.*

[12] We note that, in the model, once commitment can be conditioned on the harvest state, allowing flexibility has no remaining option value, which is why (15) is weakly negative whenever Self 1 evaluates insurance positively after the relevant history. We retain the notation because, in practice, other non-harvest-driven shocks—for example, a household member may lose non-farm employment or incur a major health expense, reducing household wealth independently of the harvest realization—may affect the demand for insurance after the first season.

[13] This condition is stronger than the bounding over-purchase on average condition (14): it requires no over-purchase in each state rather than allowing over-purchase and under-purchase across histories to offset each other on average. The excluded case is when farmers demand the option not to insure, which our experiment does not offer.

(ii) *For every fixed $\lambda_\alpha \in [0,1]$, decision-quality sophistication λ_ε weakly decreases the perceived value of flexibility in either state. If $\varepsilon_G \approx 0$ and $\varepsilon_B > 0$, its effect is negligible after a good state and is negative after a bad state whenever renewal is anticipated and Self 1 strictly values insurance. Thus, λ_ε selectively increases demand for commitment that binds after $s_1 = B$.*

Proposition 2 delivers sharper predictions about the forms of commitment and connects them directly to the two forces of undesirable state dependence. Specifically, valuation sophistication matters primarily after good harvests because Self 1 anticipates that a good state can pull Self 2's valuation downward. This force can be stronger among those who have stronger tendency for state-dependent valuations (i.e., higher α), as in Corollary 1 in Appendix E.3. In contrast, decision-quality sophistication matters primarily after bad harvests because decision quality shocks are more likely. This force can be stronger among those who are more likely to be hit by shocks (i.e., higher ε), as in Corollary 2 in Appendix E.3. Importantly, a simultaneous increase in sophistication about both forces can therefore increase demand for commitment in both states.

Note that both propositions condition on the history $h_1 = (s_0)$, therefore, aggregating over s_0 preserves these comparative statics. While s_0 can affect the level and treatment responsiveness of commitment demand, our model does not predict whether the responsiveness is larger under $s_0 = G$ or $s_0 = B$ without additional assumptions. Likewise, when both channels are present, the model does not rank the magnitude of initial insurance or commitment demand across s_0.[14]

3. Study Setting and Experimental Design

In this section, we first introduce the study setting and the project partners. We then describe the crop insurance product, the randomized intervention, and the associated manipulation checks and data collection. We conclude by providing summary statistics and balance.

3.1. Setting: Farming Activities and Project Partners

Our experiment takes place in rural villages in Western Uganda. Farming in the region is mostly smallholder based, centered around the production of maize and beans, with a small share of households producing other crops. Agriculture is the main economic activity, and the decisions we study—whether to insure and whether to restrict future flexibility—therefore involve meaningful financial stakes.

[14]To see why, consider the valuation channel, a bad s_0 increases Self 1's current valuation, which leads to two opposing forces. On the one hand this makes protection against future cancellation more valuable, but on the other hand it also requires a subsequent good state to pull anticipated valuation down from a higher benchmark before Self 1 expects cancellation. An analogous argument can be made for the decision-quality channel.

There are two growing seasons per year. The long-rain season runs approximately from March to July/August; the short-rain season runs from August to December/January. Due to climate patterns, expected yields are typically higher in the long-rain season. The experiment takes place during the short-rain season of 2024 (August–December) and the long-rain season of 2025 (March–July/August). The long-rain season preceding the experiment (Season 0 in the model notation) was hotter and drier than usual, with mean temperature 1.9σ above the long-term mean and rain 0.3σ below.

To offer crop insurance, we partner with Uganda's largest agricultural insurance association, the Agricultural Insurance Consortium (henceforth AIC), a coalition of thirteen insurance companies granted the exclusive license to operate crop insurance in Uganda. In addition, we collaborate with a crop purchase company, Yield Harvest (henceforth YH) which buys farmers' crops at harvest time and provides inputs on credit to a subset of farmers, recouping these costs directly from farmers' harvest revenues. Sales often occur at the group level, with YH agents visiting a central collection point where farmers and intermediaries deliver their crops. YH has long-standing relationships with many of the farmer groups included in the experiment.

3.2. Study Sample

YH initially provided an unverified list of contract farmers. We conducted short verification calls to confirm each farmer's intention to sell to YH over the next two seasons. This yielded a pool of approximately 500 eligible farmers. Before individual visits, we mobilized these farmers to attend group meetings. At these meetings, the insurance company gave a general introduction to the product, distributed a toll-free helpline number, and informed farmers about the upcoming household visits at which they would make their insurance decisions.

Not all farmers on the initial lists could be reached during baseline field visits. After the initial round of fieldwork, we defined a final experimental sample of 374 farmers, organized into 32 groups across six districts (Kabarole, Kamwenge, Kasese, Kikuube, Kyegegwa, Rukungiri; See Appendix A). Average farm size is 2.8 acres (median 2 acres). 282 farmers report growing maize and 328 report growing beans. These farmers are experienced smallholders with ample exposure to harvest risk but little prior familiarity with crop insurance: Only 1% of farmers had purchased crop insurance prior to our experiment. This low rate of insurance uptake is consistent with substantial under-insurance and suggests scope for potential gains from improved risk protection (Cole and Xiong, 2017; Castaing and Gazeaud, 2025).

Throughout the experiment, we collaborated closely with our field partners and invested substantial back-end effort to ensure comprehension and contract enforcement. Nevertheless, given how important these issues are in our setting, we also pre-registered a “high-quality” subsample. Farmers qualify for this subsample if they: (i) attended the group meetings, (ii) correctly answered all comprehension questions on their first attempt—covering both insurance in general and the pay-at-harvest timing of the product—and (iii) reported being “likely” or “very likely” to sell to YH in each of the next two seasons in separate verification calls. Appendix B shows that 67% of farmers meet all of these criteria and that the main experimental results are robust to restricting to this subsample, mitigating concerns about mechanical drivers of commitment (e.g., misunderstanding).

3.3. The Insurance Product

In the study, farmers were offered a *pay-at-harvest* index insurance (Casaburi and Willis, 2018) for one acre of land. The product requires no upfront payment at planting or renewal: the premium is deducted from crop revenues at harvest, when any payout is also realized. By aligning the timing of premium payments and payouts to a time after the take-up decision is made, pay-at-harvest insurance removes the conventional payment-timing channel through which present bias can generate demand for commitment. This feature is critical for testing our hypothesis of commitment against state dependence.

In our context, farmers are offered pay-at-harvest insurance for two consecutive crop seasons. Farmers can purchase a fixed insurance package, whose premium for one season is USH 60,300 (approximately USD 17), equivalent to approximately 5% (10%) of the mean (median) seasonal farm revenues.[15] Within each season, the premium is deducted from harvest revenues at the end of that season. The value of the premium is identical across the two insured seasons, and farmers are explicitly assured that the insurer will not change its terms midway and that the single-season premium will remain constant over both seasons. We also make it explicit to farmers that purchasing the crop insurance does not affect other terms of the farmer relationship with YH (e.g., crop purchase, input provision).

From the perspective of the insurer, the two seasons differ primarily in the realized harvest state, because the season-specific trigger has already absorbed most seasonal difference related to harvest.[16] Specifically, payouts depend on an area-yield index, which is based on a crop-cutting exercise. Payouts are triggered if the realized yield is below 70% of the season-crop-specific expected yield, which is approximately twice as large in the second experimental season as in the

[15] Approximately two-thirds of insurance policies cover maize production, with the remainder covering beans and rice (the latter only in the first experimental season).

[16] Of course, whether farmers receive a payout is an imperfect measure of state realization due to background risk, which is orthogonal to our focus. See Clarke (2016) for a discussion of basis risk.

first one. If the payout is triggered, its amount is equal to the product of the percent yield gap and a pre-specified amount, which is fixed ex ante and does not depend on prices or other season-specific realizations. Ex post, in the first experimental season, 53% of insured households received a payout, worth on average twice the premium value. In the second experimental season, 8% of insured households received a payout, worth on average 12% of the premium.

Relationship between insurance contract and crop selling. The insurer, AIC, signs the insurance contract with the crop purchase company, YH, which harnesses its relationship and network of farmer agents for premium collection and payout distribution. In both study seasons, YH paid the entire premium amount to AIC within the specified time frame. According to YH's administrative data, it purchased crops from 83% of farmers who bought insurance during the experiment in Season 1 and 85% in Season 2.[17] However, as transactions occur through group sales and intermediary agents, these numbers should be taken cautiously.

Premium collection and payout distribution were tied to transactions with YH. Farmers who did not sell to YH therefore received neither the benefit nor cost of the insurance, ex-post. As discussed in Casaburi and Willis (2018), expectations of side-selling may increase demand for pay-at-harvest insurance.[18] Importantly, however, expected side-selling would *reduce* the benefit of commitment against undesirable state dependence; it would not drive the demand for commitment. The reason is that side-selling gives Self 2 a (potentially costly) way to undo the commitment, thereby reducing its value from the perspective of Self 1. Moreover, a farmer's selling behavior in the first season did not affect second-season eligibility for insurance or selling to the buyer, irrespective of their decision to commit.

3.4. Insurance Purchase Decisions

In August 2024, before the first experimental season, eligible farmers were visited at home, completed a baseline survey (described in more detail in Section 3.7), and were offered the two-season pay-at-harvest insurance contract. Farmers then chose one option from this menu:

1. Do not purchase the insurance;
2. Purchase the insurance for two seasons, with the option to cancel after the first season (i.e., *flexibility*);
3. Purchase the insurance for two seasons, without the option to cancel after the first season (i.e., *commitment*).

[17] Farmers may not sell to YH because they consume their production, they sell to other buyers, or because YH did not visit their village in time. This purchase rate is higher than for farmers who did not buy the insurance.

[18] If farmers expect to sell to YH more often in bad than in good seasons, this increases the value of insurance.

If farmers chose commitment, they could then choose to commit only if they received or did not receive a payout after the first season, which we refer to as *state-contingent commitment*. Farmers were also asked to explain their reasoning behind their choices.

Allowing commitment to depend on the first-season payout helps us distinguish patterns consistent with the two different forms of state dependence that farmers may want to prevent, as described in Proposition 2. Specifically, demand for commitment that binds after a good state in season one (i.e., after not receiving a payout) is consistent with protecting against state-dependent valuations that lead farmers to undervalue insurance after a good harvest. Conversely, demand for commitment that binds after a bad state in season one (i.e., after receiving a payout) is instead consistent with protecting against state-dependent decision quality, whereby the renewal-stage decision may fail to reflect the farmer's own valuation of insurance. Farmers concerned about both forces can choose commitment that binds in both states.

Design features and alternative interpretations. The pay-at-harvest structure removes the conventional payment-timing channel through which present bias can generate demand for commitment. Since no payment is required at enrollment or renewal, both premium payments and any payouts occur after harvest in each season. Thus, demand for commitment to purchase insurance for future seasons does not arise from concerns that future selves may prefer to use available liquidity for immediate consumption. Using the same logic, other competing claims on liquidity, such as debt repayment or redistribution, can be removed. More generally, the product reallocates resources across harvest states rather than across time.

At the same time, features of the implementation and of the setting may give rise to other reasons for preferring commitment or flexibility that are unrelated to sophistication about future state dependence. For example, farmers may be uncertain about the continued availability of the product, future premiums, or the terms of their relationship with the crop buyer; they may be inattentive or may forget to revisit their insurance decision; or they may perceive costs associated with revisiting or changing their insurance choice ("hassle costs").

We designed the experimental implementation to limit these alternative explanations. First, the continued availability of second-season insurance is explicit and contractually guaranteed, and farmers are informed that premiums and other contract terms will remain fixed. Second, we implement commitment as a decision to forgo a financially costless cancellation option, rather than as a decision to purchase second-season coverage in advance. This feature also reduces farmers' concerns that the product might not remain available in the second season.[19] Third, to

[19]Importantly, this does not imply that households are defaulted into commitment. If anything, if Self 1 anticipates that Self 2 will fail to exercise the cancellation option because of inertia, this reduces the incremental benefit of

limit motives based on forgetting, inattention, or the hassle of exercising the cancellation option, we informed farmers that, regardless of their commitment decision, they would receive a follow-up call and detailed guidance before the next season. All farmers also received an information flyer and access to a toll-free helpline. These features hold fixed the main contact and information burdens.

To summarize, the pay-at-harvest design removes the conventional payment-timing mechanism associated with present bias, while the experimental implementation limits several other explanations for commitment. Nevertheless, it is still possible that commitment choices in the control group partly reflect considerations not observable during our study. We therefore do not interpret the level of commitment demand in the control group as being driven solely by sophistication about future state dependence. Instead, we use the randomized intervention described next to provide evidence on this mechanism.

3.5. Intervention: Increasing Sophistication about State Dependence

Guided by the conceptual framework, our aim is to induce an increase in sophistication about undesirable future state dependence, i.e., valuation sophistication (λ_α in the theory) and decision quality sophistication (λ_ε), and to test its effects on demand for commitment. To this end, we design an intervention that prompts farmers to mentally simulate how different harvest states shape key elements of decision-making for the subsequent seasons and to evaluate whether they would endorse those effects.

During the baseline visit, after the general explanation of the insurance product and before eliciting insurance take-up and commitment decisions, treated farmers go through three blocks as introduced below. The full script can be found in Appendix F.

Block 1: Simulating states. First, the enumerator guides farmers to think through their farming activities and insurance demand in two hypothetical scenarios: one in which they have just experienced a *good* harvest and one in which they have just experienced a *bad* harvest.[20] Within each scenario, farmers are asked to imagine how each of these scenarios would affect: their expectations about the upcoming season (e.g., whether they think another good or bad season is more likely); whether state correlation across years is the right way of thinking; how much they value having insurance; their perceived decision capacity; and their tendency to keep or cancel insurance, etc. Farmers are encouraged to elaborate on their reasoning throughout.

choosing commitment, i.e., of forgoing the cancellation option.

[20] The order of the two scenarios is randomized at the individual level.

Block 2: Prior evidence on state dependence. Second, the intervention present two contrasting patterns from prior research. Some studies find that farmers are more likely to purchase insurance after a poor season (e.g., Cole et al., 2014), consistent with insurance valuations varying with recent experience. Other studies suggest that financial stress after a poor season may either impair decision quality or lead households to reprioritize spending, potentially reducing insurance demand (e.g., Mani et al., 2013). Farmers are asked whether these patterns resonate with their own experience and whether they think it is good or bad for people in their situation to let past season affect current choices. This block therefore makes several possible forms of state dependence explicit, links these broader evidence to farmers' own reflections in Block 1, but does not tell farmers whether their own response is mistaken or which choice to make.

Block 3: Flexibility and commitment. Finally, the last block connects these reflections to the choice between flexibility and commitment. In a brief, balanced discussion, we emphasize that flexibility allows people to adapt to their current preferences and needs, which may legitimately change over time, whereas commitment gives them control over future decisions and may protect them from making choices in states they consider problematic. We explicitly note that both flexibility and commitment can be reasonable, depending on one's circumstances and concerns, and we conclude by stressing that only farmers themselves know what is best for them. Thus, this block explicitly invites reflection over desirability of future state dependence without taking a stance or recommending a particular choice.

Simulation-based modules and diagnostic perceptions. The three-block intervention is light-touch and enumerator-led, and it is based on the idea of mental simulation, similar in spirit to interventions used in other contexts, such as in Augenblick et al. (2023); Orkin et al. (2023); Ashraf et al. (2025); John and Orkin (2022); Bordalo et al. (2025); Bernard et al. (2026). The intervention is thus designed to increase sophistication about potential future state dependence, thereby helping farmers sharpen their judgment on its desirability. Unlike conventional information treatments that provide new facts or recommendations (see Haaland et al., 2023 for a review), our module offers no explicit prescriptive advice on commitment and only contains new information about prior evidence on state dependence.

Importantly, farmers' perceptions when going through different scenarios in Block 1 provide direct diagnostic evidence on the presence, and more importantly, the specific forms of state dependence existed in our setting, including state-dependent valuations and state-dependent decision quality as modeled in our conceptual framework. The module elicits, by harvest state, (i) expectations about state persistence, (ii) perceived incremental value of insurance, and (iii) self-assessed decision-making quality.[21]

Randomization. We randomly assigned the 374 farmers of our experimental sample to either the treatment or the control group. Randomization was implemented at the individual level.[22] Before data collection, we pre-registered our design and analysis plan with the AEA RCT registry.

3.6. Measuring Potential Channels

To further provide evidence on the mechanisms through which the treatment affects commitment, we include a set of manipulation-check questions within the treatment group. The aspects that map directly onto the conceptual framework (see the decomposition 11) are those about state dependence.

Channels related to (un)desirability of state dependence. The goal of the intervention is to increase sophistication about *undesirable* future state dependence: the valuation sophistication (λ_α), with which farmers realize that the valuation of future insurance decisions may be too anchored to future states, and decision quality sophistication (λ_ε), with which farmers realize that their decision-making capacity may be subject to shocks in some states.

Such increases, if successfully induced, would translate into increased anticipated distortion from disagreement, $D(h_1; \lambda_\alpha, \lambda_\varepsilon)$. This would therefore reduce the perceived value of flexibility, $\widetilde{OV}(h_1; \lambda_\alpha, \lambda_\varepsilon)$, making state dependence less appealing. If, instead, the intervention increased awareness of the benefits of flexibility, which we do not model, farmers would view state dependence as more desirable. This, however, would decrease the demand for commitment.

The manipulation-check questions are designed to capture the above key difference. That is, farmers in our framework who anticipate that future insurance decisions will be state-dependent in a way that is inconsistent with their current assessment (regarding future insurance choices) should view state dependence as undesirable. We therefore ask about farmers' judgment on the *desirability of state dependence*: "How do you judge one's changing interest in insurance depending on whether the current season is good or bad?" on a scale from 1 (not at all desirable) to 5 (very desirable).

Because farmers may differ in which harvest states they view as more problematic for decision-making, we elicited a *state-desirability judgment*: "When deciding whether to purchase insurance,

[21] The conceptual framework clarifies why inferring these channels directly from observed insurance choices can be difficult when multiple forces coexist: state dependence in realized take-up need not map one-to-one into state dependence in valuations. In particular, if decision-quality shocks affect contemporaneous insurance decisions, low take-up in bad states may reflect impaired decision quality rather than lower perceived value.

[22] Note that any potential spillover within farmer groups would have weakened the treatment effect.

in which season do you find it more sensible to do so?” Respondents choose among good season, both seasons equally, and bad season. This heterogeneity is important in our framework, as reflected in Proposition 2: the two forms of undesirable state dependence need not affect all farmers equally, and they operate in different states. Farmers who are more concerned about state-dependent valuations may therefore view bad-season decisions as particularly sensible, whereas those more concerned about shocks to decision quality may instead view good-season decisions as sensible. The measure allows us to examine how the intervention helps farmers recognize their state-specific vulnerabilities.

Other channels. To understand whether farmers already feel *currently influenced by the state* beyond sophistication about future state dependence, we asked them “Do you think that whether the past crop season was good or bad will affect your interest in insurance for the upcoming season?" As discussed in the conceptual framework, an intervention that increases sophistication about future state dependence may nevertheless increase awareness of *current* state dependence. To the extent it does, it would show up in this question as well as *attenuate* state dependence of current insurance demand. Importantly, if the intervention affected only awareness of current state dependence but not sophistication about future one, it would not induce an increase in the demand for commitment.

We additionally measure several channels that might be influenced by the intervention and could, in principle, affect commitment in ways unrelated to our conceptual framework. These other channels include trust in the insurance, ability to imagine counterfactual, self-reported frequency of contingent thinking, and broader propensity to intervene (i.e., to preemptively constrain future choices versus leaving future decisions unconstrained), as described below.

- *Trust in insurance:* “How much do you trust crop insurance offered by your off-taker?” (1 = fully distrust, 5 = fully trust).
- *Ability to imagine:* “How hard is it for you to imagine circumstances in agriculture (like a good or bad crop season) that have not yet happened?” (1 = very easy, 5 = very hard).
- *Frequency of contingent thinking:* “How often do you think about what you will do in different scenarios when you make plans for your farming activities, e.g., when things go as expected and when things do not go as expected?” (0 = never, 5 = always).
- *Tendency to intervene:* For farmers who judge state dependence as undesirable, we ask: “Would you want to tie your hands on future crop insurance decisions or leave it alone?” (options: tie hands, leave it alone, no preference).

To avoid priming in the control group, we only ask these manipulation-check questions to treatment farmers. We randomize the order of the intervention and the manipulation-checks: some farmers answer the manipulation-checks *before* the intervention, others *after*. By comparing answers across these two groups, we obtain "as-if" treatment effects on the manipulation-check variables. This design allows us to understand through which channels our treatment influences commitment demand and to avoid contaminating the pure control group (since the manipulation-checks themselves mention state dependence). With this in mind, the manipulation-check questions can also be considered part of the intervention.

3.7. Data Collection

The timeline of our activities is as follows:

Aug 2024	**Sep–Dec 2024**	**Feb 2025**	**Mar–Aug 2025**	**Jun 2025**
Baseline survey Intervention Insurance decision	Crop Season 1	**Midline survey** Cancellation/renewal	Crop Season 2	**Endline survey** Regret/complexity Guess the purpose

Baseline survey. In the baseline survey, which was administered before introducing the insurance product, we collect detailed information on household and farm characteristics, including demographics (age, household size), farm profiles (crop mix, farming plans, relationship with YH), financial variables (income, debt, etc.), and behavioral measures (self-reported risk attitudes, time preferences, memory, etc.).

To proxy state-dependent valuation, we include a measure of *projection bias* following Zhang (2026), as (an above-median indicator of) the extent to which farmers underestimate their adaptation.[23] To proxy state-dependent decision quality, we construct a *financial-stress* index as the first principal component of several self-reported questions (Sergeyev et al., 2025): how often farmers have spent time thinking about and dealing with issues related to household finances; perceived need to borrow to cover unexpected emergencies; concern about the household's financial situation; and the presence/type of debt.

Midline survey. We conduct a midline phone survey with all farmers after the first season ends and the insurer has determined whether payouts are due. We re-collect information on farming

[23] Given the relatively low-literacy setting, we adapt the original measure to facilitate comprehension, using a concrete example and eliciting its components in separate sub-questions: (i) anticipated difficulty of adapting to the change ("Imagine that you will have a serious illness: On a scale of 1 to 7, how difficult do you think it will be for you to adapt to the change after three months?") and (ii) realized difficulty of adapting to the change ("Now think about a time in the past when you were seriously ill. On a scale of 1 to 7, how difficult was it for you to adapt to the change after three months?"). A positive difference between anticipated and realized difficulty captures underestimation of adaptation.

plans and the previous season and remind farmers of their original insurance and commitment decisions. For farmers who did not commit, or whose state-contingent commitment did not bind in the realized state, we elicit their actual cancellation or renewal decisions for the second season and ask about the reasons for their choice. These midline data shed light on how ex ante commitment choices translate into insurance coverage.

Endline survey. Finally, before the second season ends, we conduct an endline phone survey with all farmers. The primary goal is to understand how farmers view their initial commitment decision in retrospect. We ask if they regret their initial commitment decision and if they would have chosen differently, which provides an ex post welfare proxy. The endline survey also helps us assess whether the intervention affected commitment through channels not captured by the manipulation-checks. For instance, we ask farmers to evaluate the complexity and effort involved in making renewal decisions to understand the role of decision costs. We also explicitly ask farmers to guess the purpose of the study to further address experimenter-demand effects.

3.8. Regression Specification

To identify causal effects of our sophistication treatment on outcomes available for the full sample, we leverage the randomized assignment at the individual level. Our main specification is:

$$y_i = \beta_0 + \beta_1 T_i + \epsilon_i, \tag{17}$$

where y_i is an outcome for farmer i—insurance purchase and commitment decisions—and T_i is a binary indicator equal to one if the farmer was assigned to the treatment described in Section 3.5 and zero otherwise.[24] We also test for heterogeneity in treatment effects by adding baseline variables X_i and their interactions with treatment to the regression model:

$$y_i = \gamma_0 + \gamma_1 T_i + \gamma_2 X_i + \gamma_3 X_i \cdot T_i + v_i, \tag{18}$$

3.9. Balance

Table 1 presents summary statistics and balance tests. Columns (1) and (2) report means for the control and treatment groups, respectively. Panel A (Demographics) shows that respondents are on average about 37 years old, with roughly 56% women. Households are moderately large (about six members) with just over one child on average, and respondents have relatively low formal education. A large majority report farming as their main occupation, though non-agricultural

[24] For the study of manipulation-checks, we restrict the analysis to farmers in the treatment group and leverage the random variation in whether the manipulation-check outcomes (m_i) are elicited before or after the administration of the treatment module: $m_i = \delta_0 + \delta_1 Post_i + \delta_2 X_i + \varepsilon_i$ where $Post_i$ is a binary indicator equal to one if the question about outcome y_i was asked after the administration of the treatment.

work is also common. Panel B (Agriculture) indicates that farmers typically manage close to two parcels, most of which are cultivated, with a non-negligible share rented in. Total cultivated land averages just under three acres, and farming revenues in the previous season are substantial but highly dispersed. Panel C (Financial) shows that usual annual income is sizable and variable and that non-farm income represents an important additional source of earnings. Around 80% of respondents report having debt. We also report the financial-stress index that we constructed. Panel D (Information and logistics) presents baseline trust of off-takers and insurance. Panel E (Behavioral measurements) summarize baseline self-reported measures of risk attitudes, ambiguity, importance of peace of mind, memory, time preferences, and the projection bias indicator. Additional variables that we use to construct "high-quality" sub-sample, such as comprehension and crop selling, are reported in Table B1.

The rest of the table shows that treatment and control are overall well-balanced on these baseline covariates, although the treatment group respondents are more likely to be women, have lower non-agricultural income, and also have a lower score on the time-preference measure. In the analysis, we show that treatment effects are robust to the inclusion of control variables.

4. Descriptive Evidence: State Dependence and Commitment

This section provides descriptive evidence of the existence and form of undesirable state dependence in our setting, as well as evidence of commitment demand. We first document that, when simulating hypothetical future states, farmers expect that harvest realizations will affect their valuations of insurance and decision-making quality, but not the likelihood of the next harvest realization. Second, we show that, even absent our experimental intervention, 40% of the control group demands commitment for pay-at-harvest insurance, a demand that cannot be explained by sophistication about present bias or many other mechanical reasons that we can rule out by design.

4.1. Two Forms of State Dependence

We first present results from farmers' scenario responses to directly assess how they perceive good versus bad harvest states as affecting valuations of insurance, decision quality, and expectations at the baseline.[25] Table 2 summarizes their answers when asked to simulate key elements of decision-making for the subsequent seasons after a bad harvest versus a good harvest (Panel A).

[25] As discussed in Section 3.5, these questions are part of the first block of our intervention, and are therefore asked only to farmers in the treatment group

The first row shows pronounced state-dependent valuation: farmers report higher insurance valuations after a bad season than after a good season (0.90 vs. 0.40: $p < 0.01$). The second row shows that farmers report lower perceived decision-making quality after a bad season than after a good season (0.30 vs. 0.50: $p < 0.01$), consistent with state-dependent decision quality driven by financial stress or scarcity. Both channels correspond closely to the forms of state dependence modeled in our conceptual framework.[26]

Panel B of Table 2 also shows that, on average, farmers do not think current choices should be influenced by the outcome of the previous seasons and that they have a positive assessment of the net benefits of commitment, suggesting baseline sophistication about undesirable state dependence.

4.2. Demand for Commitment in the Control Group

Next, we provide descriptive evidence on demand for commitment by focusing on the control group of our experiment. Take-up of the two-season pay-at-harvest insurance is high. As shown in Figure 1, 78 percent of the 182 control farmers chose to insure both seasons. 40 percent opted for the commitment option, forgoing the ability to cancel after the first harvest.

As previously discussed, no premium is due at enrollment or renewal, and the premium and potential payout for each season occur together at harvest. The direct payment-timing mechanism associated with canonical present bias (Laibson, 1997; O'Donoghue and Rabin, 1999) cannot explain demand for commitment in this setting. When asked to explain their choice, 60% of farmers gave explicitly *preventive* reasons, such as "preventing cancellation" or "avoiding regret," consistent with a non-trivial degree of sophistication about internal conflict. In contrast, only around 8% of farmers mentioned "for peace of mind".[27]

One concern is that commitment choices could reflect misunderstanding or noisy take-up (e.g., Carrera et al., 2022). Should this be the case, farmers would have taken up a commitment not to buy insurance if it were offered. Three features of our context make this less likely. First, farmers demonstrate strong understanding of the pay-at-harvest product in pre-specified comprehension checks, and demand for commitment in the control group is similar in the restricted "high-quality" subsample, as shown in Figure B1 in Appendix B. Second, in our context, farmers predominantly

[26] On average, farmers do *not* believe that a bad season is more likely to be followed by another bad season, nor that a good season is more likely to be followed by another good one. Their beliefs demonstrate a general optimism: they believe that the next season is more likely to be good in both scenarios. If anything, farmers tend to regard beliefs in strong positive serial correlation as "the wrong way of thinking."

[27] Such commitment to avoid the annoyance of having to decide twice has been documented in other settings (e.g., Andreoni et al., 2020).

view insurance as beneficial, and baseline demand for insurance is strongly positive. It is therefore unlikely that farmers would have demanded a commitment not to insure, if such an option were available. Third, as we will present next, our experimental treatment that induces sophistication (against future state dependence) increases demand for commitment, contrary to the negative response observed in Carrera et al. (2022).

Section 3.4 describes the additional design features that discipline the interpretation of the control-group commitment, including the continued availability of the product under the same term, framing of commitment as forgoing a cancellation option, and choice-independent follow-ups. These features substantially limit the scope for alternative explanations. Nevertheless, some indirect considerations may remain. We therefore turn to the experimental results to provide evidence on the specific mechanism of interest.

5. Experimental Evidence: Commitment against Undesirable State Dependence

In this section, we first show that our intervention, which was designed to increase sophistication about undesirable state dependence, induced more negative judgments about it and increased demand for commitment. We then further decompose this treatment effect, presenting evidence that both forms of undesirable state dependence in our setting—state-dependent valuations and state-dependent decision quality—contribute to demand for commitment. We also provide suggestive heterogeneity analysis consistent with the conceptual framework and consider alternative explanations for the observed treatment effects. Lastly, we conclude by examining the usefulness of commitment and farmers' satisfaction.

5.1. Treatment Effects of Increasing Sophistication

5.1.1. Desirability judgment toward state dependence

We first investigate whether the intervention moves the sophistication about undesirable state dependence as modeled in our framework. As we discussed in Section 3.6, within the treatment group, we randomized whether manipulation-check questions were administered *before* or *after* the intervention, allowing us to estimate its effects on these outcomes.[28]

Figure 2 plots the effects on standardized manipulation-check measures. The intervention

[28] The order of these manipulation-check questions has no significant effect on demand for insurance (β=0.03, S.E.=0.06) or commitment (β=0.04, S.E.=0.07). This mitigates concerns that the ordering of the manipulation-check questions independently influences the outcome of interest.

shifts the judgment toward state dependence in an undesirable direction. More than half of the farmers in the treatment group regard state dependence as undesirable, and the intervention strengthens this view: state-dependence desirability falls by 0.29σ (S.E.=0.14). This provides a direct manipulation check for the decomposition 11 derived in our framework: the intervention indeed increases sophistication about *undesirable* state dependence.

The intervention further sharpens farmers' judgments about *which* states are most sensible for making insurance decisions. Before the intervention, 73% of farmers view good and bad seasons as “equally sensible". The intervention reduces this share to 51% (-0.50σ, S.E.=0.15), with a corresponding increase in farmers identifying one state as the more sensible time to decide.[29] Thus, rather than shifting farmers uniformly toward either a good or bad state, the intervention induces greater differentiation across states—consistent with the heterogeneous state-specific vulnerabilities highlighted in our framework.

Other channels. Farmers also appear less likely to report being *currently* influenced by the state (-0.24σ, S.E.=0.15), although the effect is not significant. At least two explanations could rationalize this finding. First, as discussed earlier, an intervention that targets sophistication about future state dependence may nevertheless attenuate current state dependence, even though changes in current state dependence cannot induce a demand for commitment over future decisions. Second, treated farmers both judge state dependence more negatively and may hence be less willing to describe themselves as currently affected to reduce cognitive dissonance.

Exposure to treatment does not appear to trigger other potential channels described in Section 3.6. First, it does not significantly affect trust in insurance ($+0.16\sigma$, S.E.=0.14), suggesting that the treatment does not simply make farmers more or less confident in the product or insurer. Second, it does not change farmers' perceived ability to imagine counterfactual agricultural states ($+0.14\sigma$, S.E.=0.15), i.e., whether imagining a good or bad season feels easier or harder. Therefore, the treatment is unlikely to operate by expanding simulation capacity per se. Third, the treatment does not affect the frequency with which farmers report engaging in contingent thinking ($+0.06\sigma$, S.E.=0.15). Thus, improved contingent thinking is unlikely to be the main channel driving our later results. Finally, among farmers who already view state-dependent decision-making as undesirable, we do not detect a shift in their broader propensity to intervene, i.e., to preemptively constrain future choices versus leaving future decisions unconstrained ($+0.01\sigma$, S.E.=0.19). This is consistent with the idea that our treatment affected sophistication, but not the propensity to

[29] In addition, before the intervention, farmers disproportionately identify their *current* harvest state as the more sensible time to decide. The intervention weakens this dependence on the current state, making judgments more balanced between good and bad states.

use commitment conditional on the degree of sophistication.

5.1.2. Treatment effects on the commitment demand

We next examine treatment effects on insurance choices. First, we observe that the intervention had no significant effect on overall insurance uptake. Figure 3 shows that the share of farmers not buying insurance falls by 3 p.p., from a control mean of 22% (S.E.=0.04).[30] Enrollment in the two-season, pay-at-harvest product is similarly high in both groups, a result robust to various specifications presented in Table 3. This result suggests that the intervention does not simply make insurance more attractive and help rule out alternative explanations that would predict an effect on insurance, as we will discuss in 5.3.

The intervention induced a sizable increase in the demand for commitment. Figure 3 shows that, relative to the control group, the intervention raises the share of farmers choosing commitment by 11 percentage points, from a control mean of 40 percent (S.E.=0.05). Table 3 presents regression results and shows that our results are robust to adding sample restrictions (Row 2) and demographic, agricultural, financial and behavioral controls (Row 3-6). Notably, when focusing on the "high-quality" subsample that we pre-specified (last row)—farmers who are less subject to contracting imperfections and have a better understanding of insurance according to baseline comprehension checks—the treatment effect on commitment is even larger in magnitude (see also Figure B2 in Appendix B). Combined with the evidence from the manipulation-checks, this result suggests that increasing farmer sophistication about undesirable state dependence increases their willingness to give up flexibility, while leaving overall insurance demand largely unchanged.

Finally, we look at how treatment affects farmers' stated motives to demand commitment. Figure 4 shows that, in the control group, 60% of committed farmers cite preventive reasons (e.g., "prevent cancellation" or "avoid regret") and 68% mention non-preventive reasons (e.g., "I don't want to cancel" or "for peace of mind"), with multiple responses allowed. In the treatment group, the share citing preventive reasons rises to 74% ($p = 0.052$), while the share citing non-preventive reasons remains essentially unchanged at 69%. This suggests that the intervention increases commitment by raising farmers' awareness of the need to protect themselves from making undesirable, state-dependent choices rather than by increasing peace of mind or other non-preventive motives.

[30] The small share in uptake leaves limited scope for a selection or composition account in which the treatment effects are driven by farmers induced to purchase insurance by the intervention. This is especially notable given that the intervention shifted the intended manipulation check variables.

5.2. Unpacking State Dependence

In this section, we unpack the role of the two forms of state dependence—state-dependent valuations and state-dependent decision quality—in commitment demand. Section 4.1 provided suggestive evidence of both of these forms in farmers' perceptions. We now look at demand for state-contingent commitment and at treatment heterogeneity by survey measures of projection bias (our proxy for state-dependent valuation) and financial stress (our proxy for state-dependent decision quality). The resulting patterns are consistent with the conceptual framework.

5.2.1. Demand for state-contingent commitment

As described in Section 3.4, farmers can demand state-contingent commitment: they may forgo the cancellation option only if they receive a payout (i.e., commitment after a bad-harvest state), only if they do not receive a payout (i.e., commitment after a good-harvest state), or in both states. This design allows us to empirically determine which forms of undesirable state dependence farmers are concerned about. Proposition 2 suggests that farmers who are primarily concerned about state-dependent valuations may want commitment that binds after good harvests to avoid undervaluation, whereas those worried about impaired decision quality may want commitment that binds in bad states; farmers concerned about both will choose commitment in both states.

The coexistence of both forms of state dependence is mirrored in the types of commitment farmers choose, captured in Figure 5. Panel A on the left shows the commitment demand of farmers in the control group, divided into different types of commitment. We observe heterogeneity: two-thirds of farmers demand commitment (i.e., 26% out of 39%) that binds in both states—consistent with many exhibiting both forms of state dependence—and one-third demands commitment in only one state: 5% demand commitment only after a good state, hence, 31% (26%+5%) of farmers demanding commitment after a good state; 8% demand commitment only after a bad state, hence 34% (26%+8%) demand commitment after a bad state. Panel B on the right breaks down the effects of the treatment on the different forms of commitment. This breakdown shows how the overall increase in commitment demand is distributed across "both-states" versus state-contingent commitment. These patterns are similar in the restricted "high-quality" subsample, and if anything, the intervention has a stronger effect on good-state commitment in the subsample than in the full sample, as shown in Figure B3 in Appendix B.

5.2.2. Heterogeneity by two forms of state dependence

In heterogeneity analysis, we further ask whether the demand for state-contingent commitment documented above varies systematically with two proxies for the two forms of state dependence, thereby testing Corollary 1 and Corollary 2. Intuitively, farmers who have stronger tendency for state-dependent valuations (i.e., higher α) would be more prone to *undervaluing insurance in good states* hence may disproportionately benefit from and therefore demand commitment that binds in good states. Conversely, as decision-quality sophistication matters primarily after bad harvests because decision quality shocks are more likely there. This force can be particularly strong among those who are more prone to state-dependent shocks (i.e., higher ε).

As discussed in Section 3.7, we proxy state-dependent valuations using *projection bias*, which is one of the primary reasons why farmers may undervalue insurance after a good harvest. We also proxy state-dependent decision quality using *financial stress*, as scarcity is one of the primary reasons why farmers may make worse decisions after a bad harvest. Figure C1 shows the construction and the distribution of two proxy measures.

Table 4 reports heterogeneous treatment effects on the demand for state-contingent commitment. We regress demand for commitment that binds in a good state (Columns 1 and 3) and in a bad state (Columns 2 and 4) on the treatment indicator, the two heterogeneity indicators, and their interactions. The interaction terms capture how the treatment effect varies for farmers with projection bias and for farmers with financial stress. Two patterns emerge. First, we find suggestive evidence that farmers with projection bias are more likely to demand commitment that binds when the harvest is good: The interaction coefficient is 0.27 (S.E.=0.12) in the regression where the dependent variable is commitment after a good harvest, and 0.08 (S.E.=0.13) after a bad harvest. This pattern is consistent with the interpretation that projection-biased farmers are particularly prone to undervaluing insurance when currently in a good state, and hence place greater value on mechanisms that protect them from foregoing coverage in those states.

Second, we find that financial stress amplifies the treatment effect on commitment demand, with suggestive evidence that the amplification is larger for commitment that binds in the bad state (0.09 vs. 0.07, although the difference is not significant). This is consistent with scarcity-driven state dependence: financially stressed farmers may anticipate that decision quality deteriorates in adverse states, and therefore respond more strongly to our intervention by choosing commitment that binds precisely when the bad state is realized.

The heterogeneity analysis was not pre-registered, and we interpret these findings cautiously. Nevertheless, both state-specific patterns are qualitatively robust, and we do not detect meaningful evidence of broader treatment-effect heterogeneity among the remaining baseline covariates.[31] We also estimate Generalized Random Forests (henceforth GRF, see Athey et al. 2019),

[31]For transparency, Appendix Table C1 reports treatment interactions with the full set of baseline covariates. The projection bias dummy and the financial stress index rank among the strongest, respectively for commitment after a

which allows treatment effects to vary flexibly across the covariate space without requiring us to specify the relevant interactions in advance. The omnibus GRF calibration tests also do not provide evidence of broad treatment-effect heterogeneity (Appendix Table C2). We then use best linear projections of the forest predictions to examine our two theory-motivated moderators (Appendix Table C3). These projections reproduce the qualitative state-specific patterns from the linear interaction regressions. Projection bias is associated with a substantially larger treatment effect on commitment in the good state (coefficient = 0.275, 95% CI $[0.046, 0.504]$) than in the bad state (coefficient = 0.098, 95% CI $[-0.145, 0.342]$). Conversely, financial stress is associated with a larger treatment effect on commitment in the bad state (coefficient = 0.109, 95% CI $[0.012, 0.206]$) than in the good state (coefficient = 0.081, 95% CI $[-0.015, 0.178]$).

To summarize, the exploratory patterns align with the conceptual distinction between state-dependent valuations and state-dependent decision quality, and they suggest that the demand for state-contingent commitment may be shaped by the particular form of state dependence that farmers perceive as most problematic for their own insurance decisions.

5.3. Alternative Explanations

Although our treatment is tailored to test the role of sophistication about undesirable state dependence, and we have made various design choices and built in manipulation-check questions to rule in and rule out different explanations, there are still interesting alternative explanations that may partly also explain our treatment effects, which we now discuss below.

Thinking and deciding about insurance is costly. An alternative explanation is that commitment is valued simply because making insurance decisions is itself costly: farmers may prefer commitment to avoid the hassle of revisiting the renewal decision, remembering deadlines, or repeatedly weighing the same choice. This consideration may interact with our treatment if the intervention reduces the *cognitive cost of contemplating* insurance and commitment.[32] Because our intervention helps farmers think through future scenarios, it could in principle increase commitment demand by making the decision problem easier, rather than by improving sophistication about future state dependence. To assess this possibility, we elicited at endline how easy or com-

good and bad state. Interestingly, and consistent with the pay-at-harvest design, we do not observe heterogeneous treatment effects by time preferences.

[32] This mechanism relates to a theoretical literature in which costly cognition about contractual contingencies affects ex ante contract design (e.g., Tirole, 2009) as well as broader work on rational inattention and complexity in which agents economize on scarce cognitive resources by simplifying the problems they consider (e.g., Gabaix, 2014; Gabaix and Graeber, 2024; Maćkowiak et al., 2023; Oprea, 2020; Ilut and Valchev, 2023). It is also closely related to Ergin and Sarver (2010)'s axiomatic representation of "costly contemplation," under which agents may avoid contingent decision rules in favor of simpler choices.

plex farmers found deciding about insurance again on a five-point scale (1 = very easy, 5 = very complex). Overall, 87% of farmers describe the insurance decision as very easy or somewhat easy, and we find no treatment effect on self-reported decision complexity (treatment: 1.70 vs. control: 1.76; two-sided t-test: $p = 0.54$). In addition, as discussed in Section 4, our design deliberately holds such hassle costs largely constant, and very few farmers cite peace of mind" as their primary motive for commitment relative to preventive reasons. Taken together with the design features above, these results suggest that reduced decision cost is unlikely to be the primary driver of the increase in commitment demand, especially the demand for state-contingent commitment.

Failures of contingent thinking. A complementary explanation is that the intervention mitigates failures of contingent thinking—the difficulty of reasoning through contingencies and conditioning choices on different states, especially in uncertain environments (e.g., Martínez-Marquina et al., 2019). While there is not yet a consensus theoretical construct, recent work defines such failures broadly and operationally as settings in which decision aids that make contingencies more explicit improve performance (Niederle and Vespa, 2023). In this sense, a contingent-thinking channel is broadly consistent with our main treatment effect from the sophistication intervention, which guides farmers to think through state dependence. However, we find no evidence that the intervention increases self-reported frequency of contingent planning in our context (Section 5.1). Even if this self-report is imperfect and context-specific, contingent thinking alone is unlikely to account for our full set of findings, particularly the state-contingent patterns of commitment demand and heterogeneity across farmers.

Experimenter demand effect. First, since farmers are making high-stakes decisions (the average insurance payout accounts for around 5–10% of their seasonal harvest revenue), it is unlikely that they would change their behavior to accommodate researchers or our field agents. Second, the intervention provided a balanced discussion of the relative benefits of flexibility and commitment. Thus, it is unclear a priori how we expect farmers to behave. Third, while our intervention did not take a stand on commitment, it portrayed insurance in a positive light, and respondents may have inferred that the intervention was intended to influence insurance-related decisions. To assess this possibility, in the endline survey we asked farmers to guess the purpose of the study (De Quidt et al., 2018). The most common responses were crop insurance (45%) and farming methods or education (28%), while almost no respondents mentioned commitment. Thus, to the extent that experimenter demand differentially affected behavior by treatment, we would expect it to operate primarily through insurance take-up rather than commitment. Notably, however, the treatment has only a small and statistically insignificant effect on insurance take-up, mitigating concerns that experimenter demand drives our treatment effect on commitment.

Enhanced valuation of insurance or the relationship with agents. The intervention might help farmers realize the value of insurance, for example, because our intervention is reminiscent of a planning prompt (e.g., Beshears et al., 2016; Milkman et al., 2013) that may make farmers think about the future (Martínez-Marquina and Rasocha, 2025), or make farmers trust their agents more. This would encourage greater commitment as a means of securing more valuable coverage. Yet we consistently find no significant treatment effect on overall insurance take-up, even though commitment demand rises. We also detect no treatment effects on trust. These patterns suggest that it is unlikely that the enhanced valuation of insurance or the relationship with agents drives the demand for commitment.

5.4. Consequential Commitment and Farmers' Satisfaction

Lastly, we briefly describe farmers' cancellation and renewal behavior in the midline survey, as well as a few self-reported variables regarding satisfaction in the endline survey.[33]

We highlight that commitment appears to be a consequential choice. In the midline survey we observe that 98 percent of those who pre-committed renew their coverage for the second season, compared to an 89 percent renewal rate among non-committed farmers. While this 9-percentage-point gap ($p = 0.01$) is not identified causally, since commitment was not randomly assigned, it suggests that commitment has meaningful consequences for follow-through. Notably, even non-committed farmers renew at high rates, which could be partly due to the fact that the first experimental season ended up very bad as 53% of insured households received a payout. Nevertheless, this finding is also consistent with the high take-up rate of the same product in a different setting (Casaburi and Willis, 2018) after the upfront-payment constraint is removed.

Farmers who take up commitment appear satisfied with having done so. We ask all endline farmers to evaluate the quality of their baseline decision on a five-point scale (1 = very poor, 5 = very good). Among insured farmers, more than 80% of farmers think they made a (somewhat) good decision at the baseline. We also ask all insured farmers to further report their level of regret for their baseline insurance choice on a five-point scale (1 = Definitely no, 5 = Definitely yes). Among insured farmers, commitment is associated with lower ex-post regret, whether or not we control for the treatment (committed: 1.57 vs. non-committed: 2.07; two-sided t-test: $p < 0.01$).[34] When asked whether they would have preferred to have had the option to cancel, 94.3% of the committed farmers responded "Definitely no" or "Probably no".

[33] Of the 374 farmers in our sample, 365 completed the endline survey. The average attrition rate is 2.4%, and balanced between the treatment and control groups.

[34] Those who turned down the insurance are significantly less satisfied with their decision than those who took up insurance (insured: 4.21 vs. not insured: 3.01; two-sided t-test: $p < 0.01$).

While we cannot definitively resolve the broader welfare consequences of commitment, which we return to in the conclusion, these patterns are reassuring in our setting. Given the minimal exposure to insurance, which substantial under-insurance and scope for gains from improved risk protection, sustaining coverage may therefore generate meaningful benefits here.

6. Conclusion

This paper provides field evidence on the demand for commitment against undesirable future state dependence in a high-stakes setting—demand for pay-at-harvest crop insurance—in which the potential role of dynamically inconsistent intertemporal preferences (e.g., present bias, as in Laibson, 1997; O'Donoghue and Rabin, 1999) is removed. We document substantial demand for commitment and show experimentally that sophistication about undesirable state dependence is an important driver of this demand. The evidence points to two broad forces: one based on state-dependent valuations (e.g., projection bias), and the other based on state-dependent decision quality (e.g., scarcity). These forces are likely to matter especially in environments with substantial state variability. Accounting for them broadens our understanding of commitment beyond time inconsistency, suggests a more nuanced welfare analysis, and suggests new instruments for policy and product design, which we elaborate below.

First, our results qualify how the familiar puzzle of low demand for commitment devices from the time preference perspective (Laibson, 2015) should be interpreted. A standard explanation is that commitment sacrifices valuable flexibility, especially in environments with substantial state variability. Our findings show that state variability can cut both ways: it creates option value from retaining flexibility, but can also create predictable states in which individuals would prefer to restrict their future choices. As conjectured by Bernheim and Taubinsky (2018), coarse commitment devices may therefore understate demand when individuals would prefer to target commitment to particular states. Although most farmers in our setting prefer commitment across both states, the substantial demand for state-contingent commitment shows that this margin matters for a meaningful subset. Moreover, demand depends on sophistication about the *undesirable* component of future state dependence: individuals who do not anticipate that their future choices will be distorted have little reason to commit against those distortions.[35] Consistent with this, our intervention makes farmers more aware that state dependence is undesirable and increases commitment demand. More broadly, the relevant distortion need not be present bias. As Breza

[35]State dependence itself need not be undesirable; for example, Strack and Taubinsky (2026) show that state-dependent revisions of advance choices can be rationalized by time-consistent preferences without additional information.

and Kaur (2026) note, sophistication can apply to behavioral forces beyond time inconsistency. Commitment may become more useful when it targets the particular behavioral friction people themselves view as problematic.

Second, our framework and analysis inform—but do not settle—the welfare question when behavioral distortions are present (Bernheim and Taubinsky, 2018). Our findings make the already difficult question of which state is normatively relevant, emphasized by Bernheim and Rangel (2007), harder. In their framework, one might privilege the state, or "decision frame," in which choices are most consistent. In our setting, however, both insurance valuations and decision quality vary across harvest states, and these dimensions need not point to the same state. Therefore, welfare analysis requires taking a stance on the nature of the underlying forces, the policy objective, and, most importantly, which state should be regarded as better and for whom. If one seeks to minimize decision mistakes, the good-harvest state may be preferable, since farmers themselves report making better decisions there. If greater insurance coverage is viewed as desirable—plausibly so in a setting of widespread underinsurance—the bad-harvest state, in which insurance is valued more, may deserve greater weight. More broadly, there need not be a single decision state that is normatively privileged across contexts—or necessarily across individuals. Moreover, even when commitment addresses undesirable state dependence, farmers may misperceive its net benefits.[36] The welfare effects of commitment therefore ultimately depend both on normative considerations above and on whether individuals correctly perceive the benefits of discipline relative to the value of retaining flexibility.

Lastly, our findings suggest implications for the design of commitment products when future distortions are state-dependent. First, commitment need not eliminate future discretion altogether: products can incorporate *flexible commitment*, allowing individuals to restrict their choices selectively in states in which they anticipate being particularly vulnerable. For example, contracts could allow individuals to pre-authorize renewal after adverse shocks while retaining flexibility after favorable realizations. Our evidence suggests that individuals do make use of such state-contingent commitment options.[37] Second, product design can help individuals anticipate the behavioral forces against which they may wish to commit, by prompting individuals to mentally simulate how future states will affect key dimensions of their decisions. Such approaches may be useful more broadly whenever choices are made under predictably changing income, health, or financial conditions.

[36] See Bronchetti et al. (2023) for evidence that individuals may misperceive the returns to future decision aids that reduce attention costs.

[37] Bond and Sigurdsson (2018) show theoretically that commitment and state-contingent flexibility can coexist in an appropriately designed contract; to our knowledge, there is little empirical evidence on such contract design.

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Tables and Figures

Table 1: Balance table

Variables:	Control (1)	Treatment (2)	T − C (3)	p-value (4)
Panel A: Household demographics				
Age	36.64	36.59	-0.05	0.97
			(1.24)	
Female	0.49	0.62	0.13**	0.01
			(0.05)	
Household size	5.81	6.03	0.21	0.46
			(0.29)	
Children number	1.25	1.23	-0.02	0.87
			(0.11)	
Education level	1.75	1.70	-0.05	0.66
			(0.12)	
Farming occupation	0.84	0.85	0.01	0.83
			(0.04)	
Non-agricultural work	0.64	0.60	-0.04	0.45
			(0.05)	
Panel B: Agricultural activities				
Number of parcels:				
Owned	1.90	1.85	-0.05	0.71
			(0.13)	
Cultivated	1.67	1.59	-0.08	0.50
			(0.12)	
Rented	1.17	1.10	-0.07	0.58
			(0.13)	
Total acreage farming	2.93	2.73	-0.20	0.45
			(0.27)	
Farming revenue last season	1,247.92	1,028.94	-218.98	0.14
			(147.12)	
Panel C: Financial variables				
Usual year income	3,249.01	2,707.33	-541.68**	0.04
			(266.53)	
Usual non-farming year income	1,088.38	919.63	-168.75	0.24
			(143.25)	
Financial Stress (pc)	0.00	0.00	0.00	0.97
			(0.13)	
Has debts	0.79	0.80	0.01	0.79
			(0.04)	
Panel D: Information and logistics				
Trust in crop insurance	3.51	3.49	-0.02	0.90
			(0.12)	
Trust in YH	2.42	2.50	0.08	0.50
			(0.12)	
Panel E: Behavioral measurements				
Farming risk level	0.75	0.73	-0.02	0.85
			(0.10)	
Worry about risk	2.97	2.97	0.01	0.95
			(0.12)	
Risk willingness level	0.75	0.59	-0.16	0.22
			(0.13)	
Ambiguity comfort level	0.40	0.26	-0.14	0.30
			(0.13)	
Peace of mind level	4.24	4.22	-0.02	0.77

Continued on next page

Table 1 continued

Variables:	Control (1)	Treatment (2)	T − C (3)	p-value (4)
			(0.08)	
Memory ability level	1.04	0.98	-0.05	0.61
			(0.10)	
Time preference level	1.49	1.15	-0.34***	0.00
			(0.10)	
Projection Bias Indicator	0.19	0.22	0.03	0.53
			(0.04)	
N	182	192		

Notes: This table reports summary statistics and balance tests for baseline covariates. Columns (1) and (2) report control- and treatment-group means in the variables' original units. Column (3) reports the treatment-minus-control difference in the same units, with HC1 robust standard errors in parentheses, and Column (4) reports the p-value from a two-sided test of equality. All statistics are displayed to two decimal places, and no variable is standardized for display or for the balance regressions. The final row reports sample size by treatment assignment; individual regressions use all available nonmissing observations. Variables are grouped into household demographics, agricultural activities, financial variables, information and logistics, and behavioral measurements. Farming occupation is an indicator for farming being the respondent's main occupation; non-agricultural work is an indicator for engaging in any non-agricultural work. The financial-stress index is the first principal-component score of several self-reported questions, following Sergeyev et al. (2025). The projection-bias indicator equals one for respondents whose projection-bias score—the extent to which people underestimate adaptation—is above the sample median, following Zhang (2026). Farming revenue last season and income measures are reported in USD. Statistical significance is denoted by * $p < 0.1$, ** $p < 0.05$, and *** $p < 0.01$.

Table 2: State dependence of hypothetical insurance decisions

Variables:	Bad season			Good season			p-value
	Mean	SD	Obs.	Mean	SD	Obs.	(Good=Bad)
Panel A: Farmers' perceptions following a hypothetical bad or good season							
Valuation insurance	0.901	0.874	191	0.398	0.845	191	0.000
Decision making capacity	0.304	0.642	191	0.497	0.522	191	0.000
Panel B: Baseline views toward state dependence							
Good to be influenced by past season	-0.335	1.254	191				
Costs vs. benefits of commitment	0.377	0.736	191				

Notes: The table reports farmer responses during the intervention of thinking through state dependence. Panel A reports farmers' perceptions following a hypothetical bad or good season. *Valuation insurance* measures how a just-experienced season affects the respondent's valuation of PAH insurance for the next season, elicited on a five-point scale from -2 (value much less) to $+2$ (value much more). *Decision-making capacity* measures perceived decision quality in that state: how a just-experienced season affects the ability to make important decisions (e.g., about farming or insurance), elicited on a three-point scale from -1 (worse decisions) to $+1$ (better decisions). The final column reports the p-value from a within-respondent test of equality between the good- and bad-season responses (Good=Bad). Panel B reports baseline views toward state dependence. *Good to be influenced by past season* elicits whether it is good or bad that insurance decisions are influenced by the last harvest realization, on a five-point scale from $+2$ (very good) to -2 (very bad). *Costs vs. benefits of commitment* captures whether farmers perceive the benefit of commitment to be greater $(+1)$ or the cost of commitment to be greater (-1).

Table 3: Treatment effects on insurance decisions

Variables:	Insurance decision		
	No insurance	Cancelation	Commitment
	(1)	(2)	(3)
Treatment	-0.032	-0.077	0.109**
	(0.042)	(0.049)	(0.051)
+ Restrictions	-0.031	-0.076	0.108**
	(0.040)	(0.049)	(0.051)
+ Demographics	-0.028	-0.073	0.101**
	(0.041)	(0.050)	(0.050)
+ Agriculture	-0.045	-0.081	0.126**
	(0.043)	(0.050)	(0.052)
+ Financial	-0.039	-0.090*	0.129**
	(0.043)	(0.050)	(0.052)
+ All controls	-0.032	-0.096*	0.128**
	(0.040)	(0.050)	(0.051)
Restricted sample	0.004	-0.148**	0.145**
	(0.047)	(0.065)	(0.064)

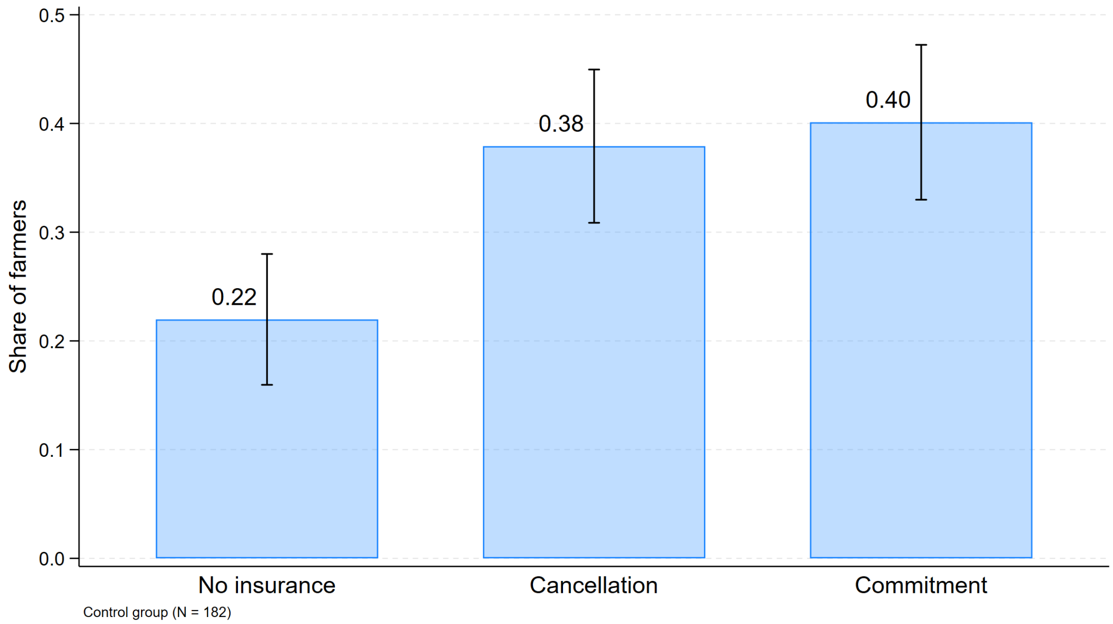
Notes: This table reports robustness to the inclusion of controls of the treatment effects reported in Figure 3: the effects of the sophistication intervention on demand for insurance and commitment. The first row reports regression results without controls. Subsequent rows expand the set of controls, using those reported in the balance table, table 1. The final row, "restricted sample", reports the results restricting the sample to the "high quality" farmer sample as defined in the text and as reported as an option in the pre-registration.

Table 4: State-contingent commitment by projection bias and financial stress

	(1) Commit Good State	(2) Commit Bad State	(3) Commit Good State	(4) Commit Bad State
Treatment	0.080	0.080	0.134***	0.096*
	(0.056)	(0.057)	(0.050)	(0.050)
Treatment*Projection Bias	0.268**	0.077		
	(0.124)	(0.125)		
Treatment*Financial Stress			0.068*	0.090**
			(0.040)	(0.040)
Control Mean	0.32	0.35	0.32	0.35
Observations	374	374	374	374

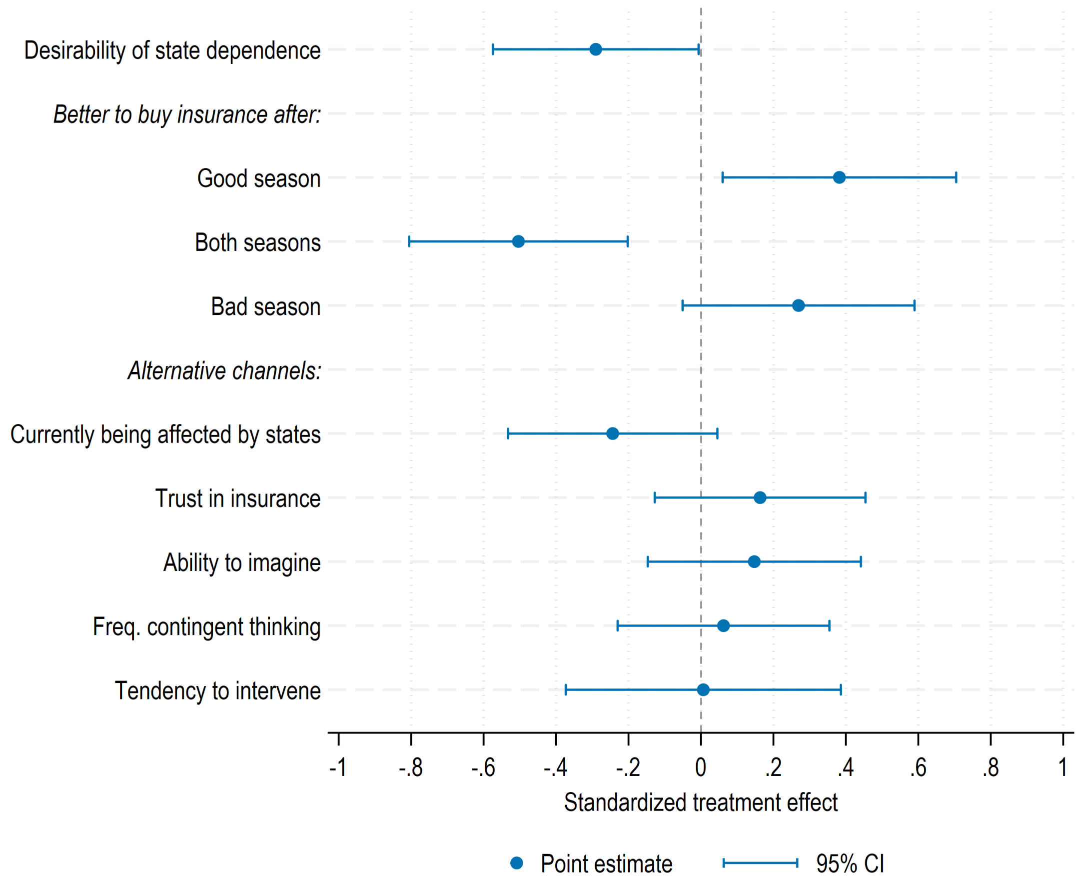
Notes: This table examines demand for state-contingent commitment that binds conditional on the realized harvest state in the first season. The dependent variable is a binary indicator for choosing a commitment option that binds only in a good harvest state or in both states (Columns 1 and 3), and for choosing a commitment option that binds only in a bad harvest state or in both states (Columns 2 and 4). The main regressor is the binary treatment indicator, interacted with two proxies for the two forms of state dependence introduced in the conceptual framework. *Projection bias* is measured as underestimation of adaptation and coded as having higher tendency for projection-bias based on a median split following Zhang (2026). *Financial stress* is measured using the first principal component of several self-reported financial-stress questions following Sergeyev et al. (2025). Interaction terms show how treatment effects differ for farmers with above-median projection bias or higher financial stress. Robust standard errors are reported in parentheses. Statistical significance: $*p < 0.10, **p < 0.05, ***p < 0.01$.

Figure 1: Demand for insurance and commitment in control group



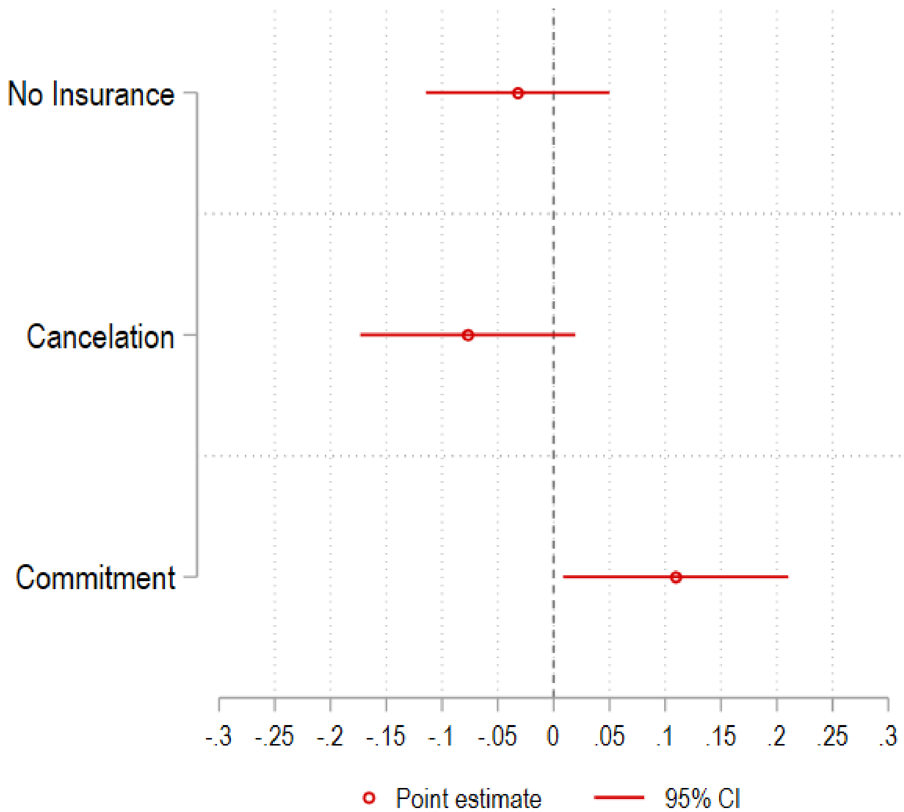
Notes: This figure presents farmers' insurance decisions in the control group, without the intervention. At the beginning of the first season, farmers are offered insurance for the following two seasons, as well as the option to keep or to turn down the option to cancel the insurance at the start of the second season. Turning down the cancellation option represents committing to insurance. The figure shows the proportion of farmers choosing no insurance, insurance with cancelation, and insurance with commitment.

Figure 2: “As-if" treatment effects on manipulation checks



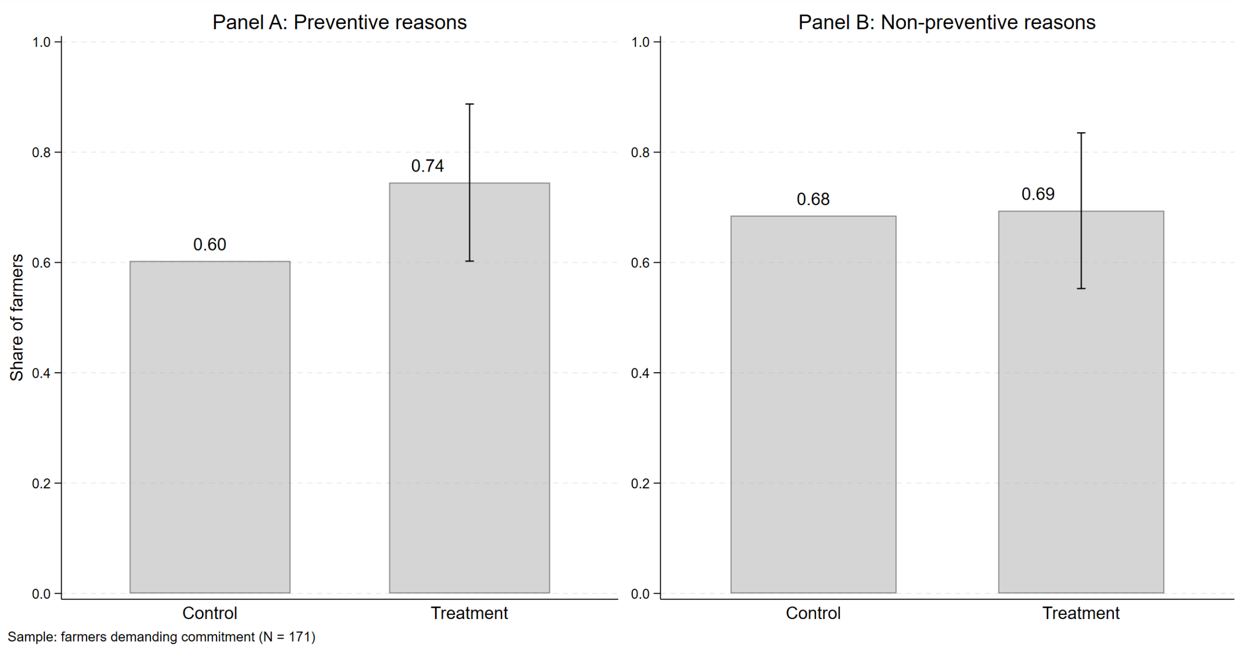
Notes: This figure reports within-treatment “as-if” treatment effects of the sophistication intervention on the intended manipulation checks and alternative channels. The questions were asked only to treated farmers, and we randomized at the individual level whether they were asked *before* or *after* the intervention. Each point is the coefficient from a regression of a standardized outcome on an indicator for being asked *after* (vs. before) the intervention; bars show 95% confidence intervals. Outcomes are standardized using the mean and standard deviation among treated farmers asked *before* the intervention. The regressions use up to 192 treated farmers, depending on item response. *Desirability of state dependence* measures how desirable respondents judge changing one’s interest in insurance depending on whether the current season is good or bad. *Better to buy insurance after* reports which season is considered most sensible for making an insurance decision; the plotted coefficients are indicators for choosing *Good season*, *Both seasons*, or *Bad season*. Under alternative channels, *Currently being affected by states* measures the self-reported likelihood of currently being influenced by the harvest state. *Trust in insurance* elicits trust in crop insurance offered through the offtaker. *Ability to imagine* measures how difficult it is to imagine agricultural circumstances that have not yet occurred. *Freq. contingent thinking* measures how often respondents consider different scenarios when planning farming activities. *Tendency to intervene* asks, among respondents who state that state-dependent decision-making is undesirable, whether they would prefer to constrain their future insurance choice rather than leave it unconstrained.

Figure 3: Treatment effects on insurance decisions



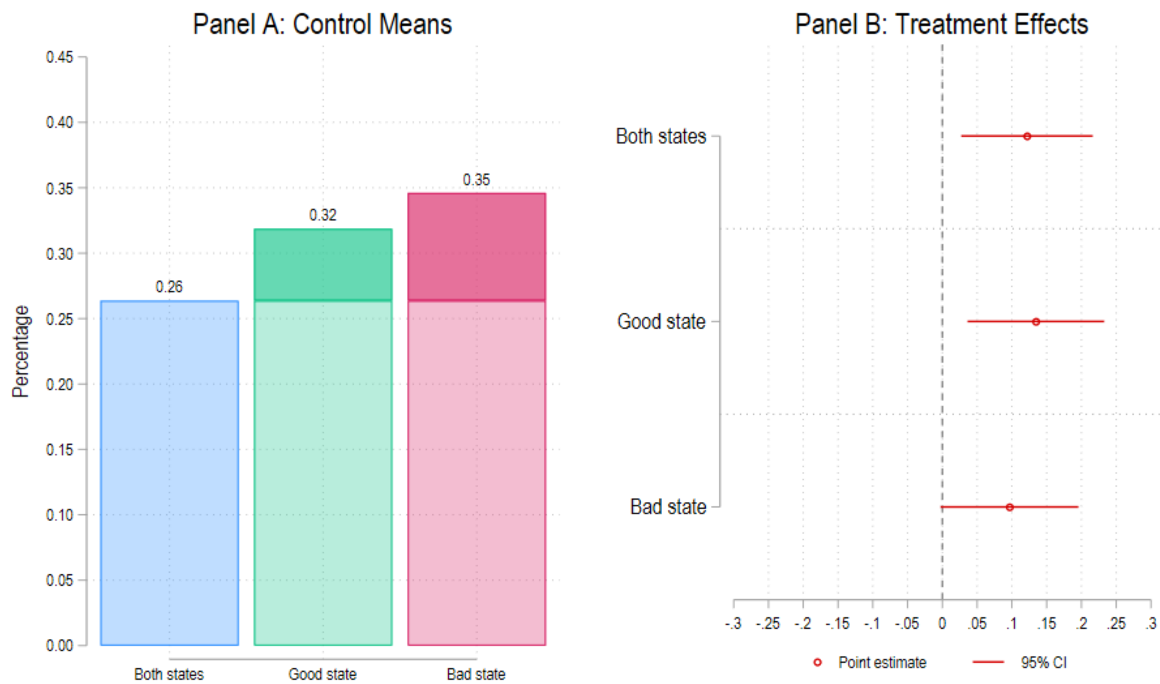
Notes: This figure reports treatment effects on farmers' insurance decisions. Each dot is the coefficient on the treatment indicator from a separate OLS regression with the dependent variable equal to an indicator for the corresponding outcome: *No insurance* (not interested in insurance), *Cancellation* (prefer insurance for two seasons and keep the option to cancel after the first season), and *Commitment* (prefer insurance for two seasons and turn down the option to cancel after the first season). Randomization was at the individual level, hence standard errors are not clustered. Horizontal bars show 95% confidence intervals.

Figure 4: Reasons for demanding commitment



Notes: This figure reports reasons given by farmers who wanted commitment, separated by control and treatment groups. Farmers could offer multiple answers to the question; we classified their answers conservatively into "Preventive reasons" (I want to prevent myself from canceling, I want to avoid regretting) and "Non-preventive reasons" (I don't plan to cancel anyway, Not having to decide again gives me peace of mind, I want to follow what others are doing). The treatment bar displays a 95% confidence interval regressing a dummy for giving at least one such reason on a treatment dummy.

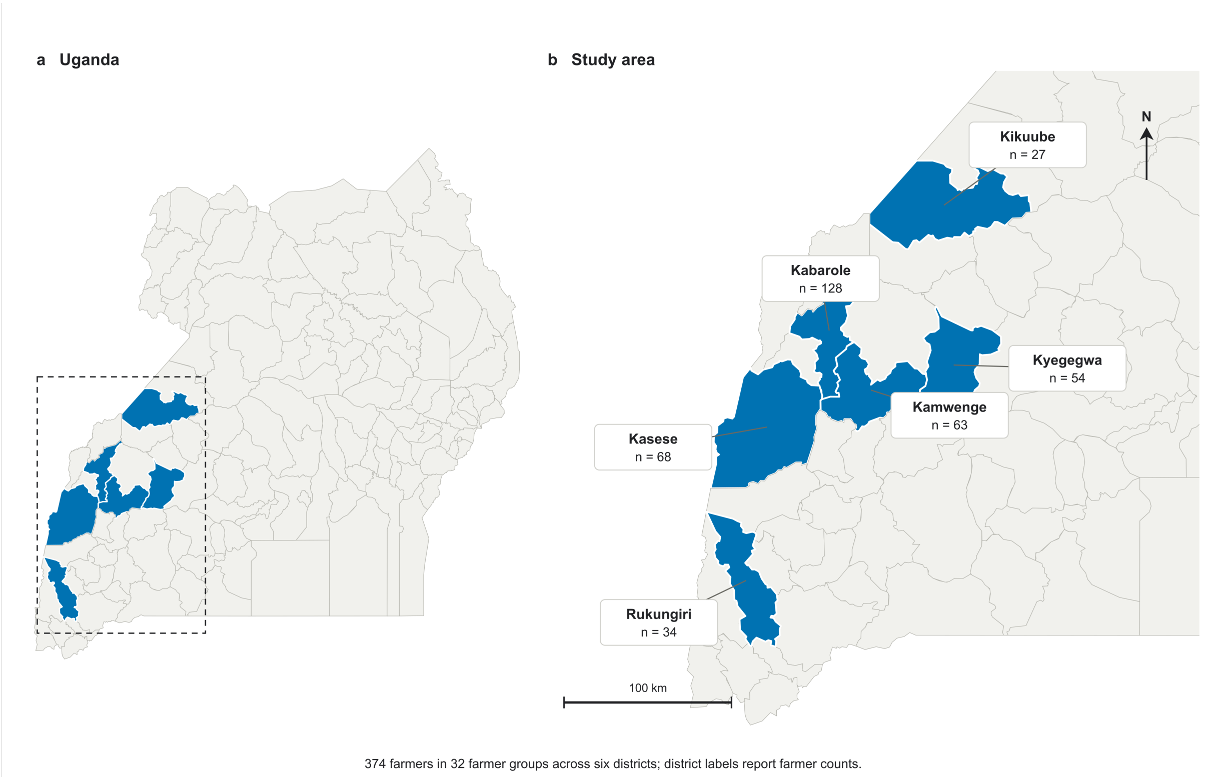
Figure 5: Demand for state-contingent commitment



Notes: This figure presents farmers' demand for state-contingent commitment. When farmers decide on insurance for the following two seasons at the beginning, they are also offered the option to keep or to turn down the option to cancel the insurance at the start of the second season, by state (whether there is an insurance payout in the first season) if desired. Panel A on the left reports the commitment demand of farmers in the control group, divided into different types of commitment: (i) demand for commitment that binds in both harvest states; (ii) demand for commitment in the good state, which mechanically includes those who also commit in both states; and (iii) demand for commitment in the bad state, also including the both-states group. Panel B on the right breaks down the treatment effects on the three types of commitment.

Appendix A. Study Districts and Samples

Figure A1: Study districts and final experimental sample



Notes: Dark blue polygons identify the six study districts. District labels report the number of farmers in the final experimental sample. The 374 farmers were organized into 32 farmer groups. The de-identified analysis file retains district and subcounty, but not the group-to-district linkage, so the figure does not report group counts by district or plot household coordinates. District boundaries are from the Uganda Bureau of Statistics (2020), with support from the World Health Organization.

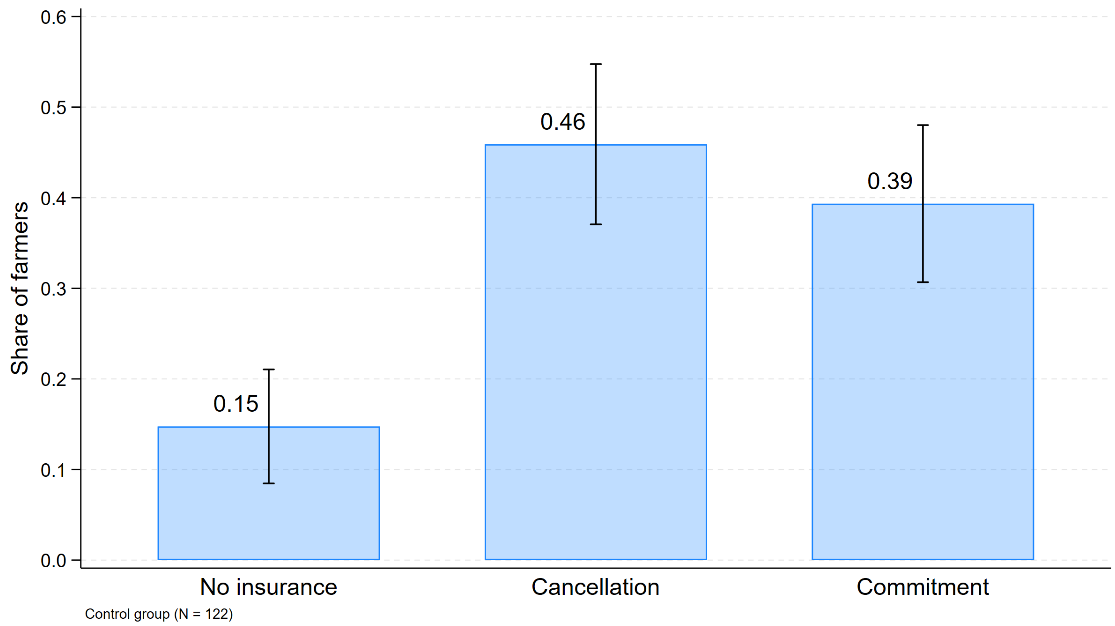
Appendix B. Results from the High-quality Subsample

Table B1: Overview of pre-registered “high-quality" subsample

Variables:	Sample		Control		Treatment		C vs. T
	N	Mean	N	Mean	N	Mean	P.value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sample restriction indicator	374	0.671	182	0.670	192	0.672	0.975
		(0.024)		(0.035)		(0.034)	
Informed about insurance	374	0.872	182	0.874	192	0.870	0.912
		(0.017)		(0.025)		(0.024)	
Likelihood sell to YH	374	0.939	182	0.934	192	0.943	0.929
		(0.048)		(0.074)		(0.062)	
PAH correct	374	0.968	182	0.973	192	0.964	0.622
		(0.009)		(0.012)		(0.014)	

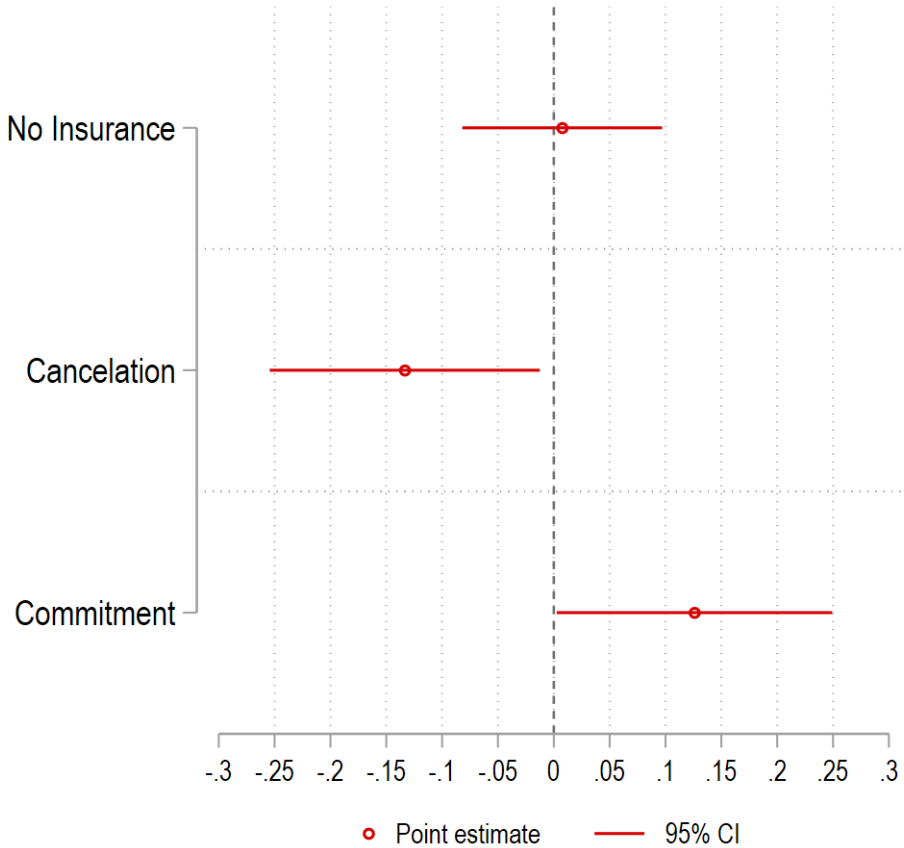
Notes: This table summarizes the pre-registered criteria used to define the “high-quality” subsample and tests balance across experimental arms. The sample restriction indicator equals 1 if the farmer satisfies all criteria: (i) attended the group meetings hence were informed about insurance, (ii) correctly answered all insurance comprehension questions on the first attempt (including questions on the pay-at-harvest timing), and (iii) reported being “likely” or “very likely” to sell to YH in each of the next two seasons in separate verification calls. Columns (1)-(2) report the number of observations and the sample mean (standard error in parentheses) for the full sample. Columns (3)-(4) and (5)-(6) report the corresponding statistics for the control and treatment groups, respectively. Column (7) reports the p-value from a two-sided t-test of equality of treatment and control means. Statistical significance is denoted by * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure B1: Demand for insurance and commitment in control group (subsample)



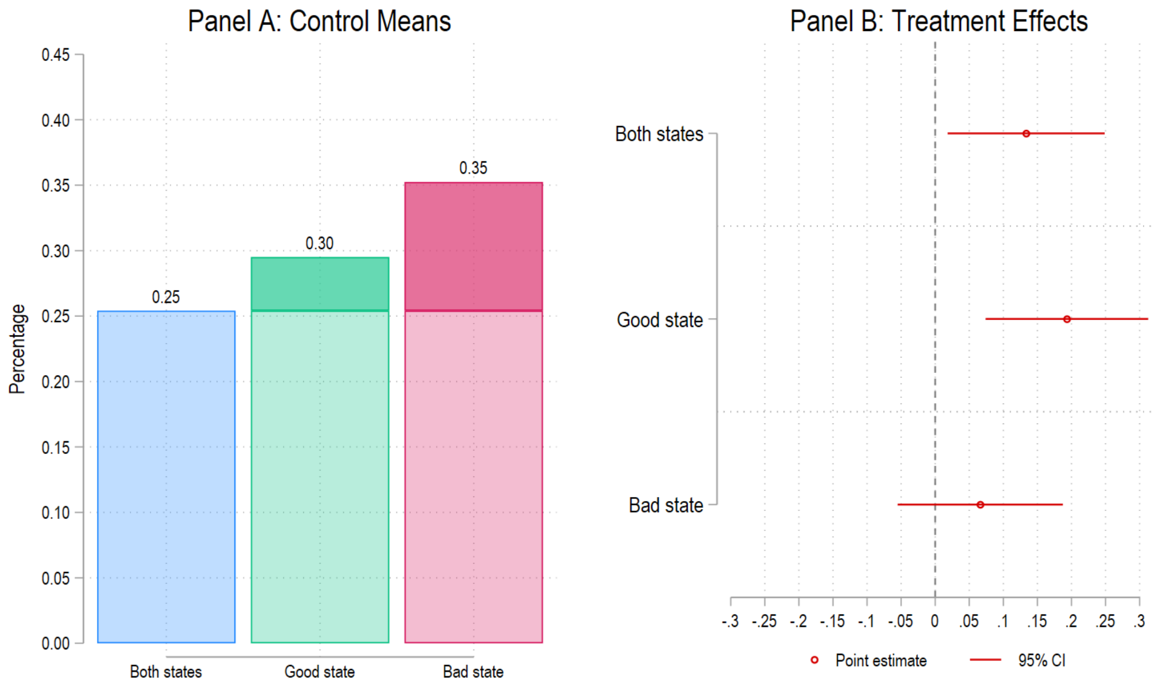
Notes: This figure presents farmers' insurance decisions in the control group, without the intervention, as in Figure 1 but using the pre-registered high-quality subsample. At the beginning of the first season, farmers are offered insurance for the following two seasons, as well as the option to keep or to turn down the option to cancel the insurance at the start of the second season. Turning down the cancellation option represents committing to insurance. The figure shows the proportion of farmers choosing no insurance, insurance with cancelation, and insurance with commitment.

Figure B2: Treatment effects on insurance decisions (subsample)



Notes: This figure reports treatment effects on farmers' insurance decisions, as in Figure 3 but using the pre-registered high-quality subsample. Each dot is the coefficient on the treatment indicator from a separate OLS regression with the dependent variable equal to an indicator for the corresponding outcome: *No insurance* (not interested in insurance), *Cancellation* (prefer insurance for two seasons and keep the option to cancel after the first season), and *Commitment* (prefer insurance for two seasons and turn down the option to cancel after the first season). Randomization was at the individual level, hence standard errors are not clustered. Horizontal bars show 95% confidence intervals.

Figure B3: Demand for state-contingent commitment (subsample)

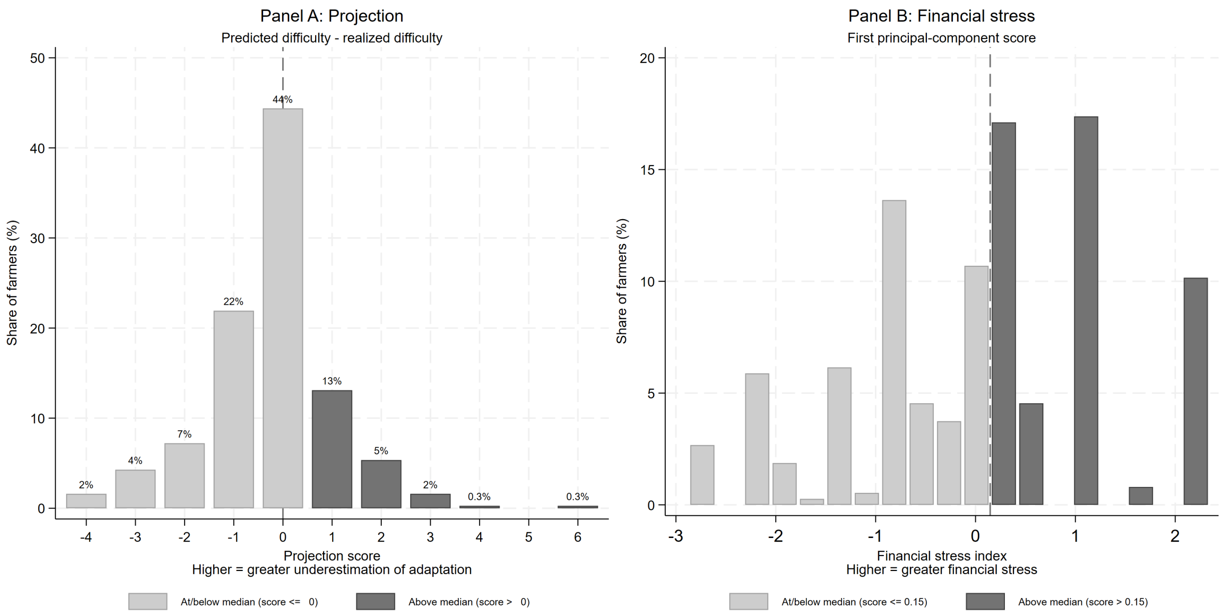


Notes: This figure presents farmers' demand for state-contingent commitment, as in Figure 5 but using the pre-registered high-quality subsample. When farmers decide on insurance for the following two seasons at the beginning, they are also offered the option to keep or to turn down the option to cancel the insurance at the start of the second season, by state (whether there is an insurance payout in the first season) if desired. Panel A on the left reports the commitment demand of farmers in the control group, divided into different types of commitment: (i) demand for commitment that binds in both harvest states; (ii) demand for commitment in the good state, which mechanically includes those who also commit in both states; and (iii) demand for commitment in the bad state, also including the both-states group. Panel B on the right breaks down the treatment effects on the three types of commitment.

Appendix C. Additional Heterogeneity Analyses

Appendix C.1. Distributions of the Heterogeneity Measures

Figure C1: Distributions of the theory-driven heterogeneity measures



Notes: This figure presents the distributions of the two pre-treatment moderators used in the heterogeneity analysis. Panel A shows the projection-bias score, defined as farmers' predicted difficulty adapting to a serious three-month illness minus their reported difficulty adapting to a past illness. Higher values indicate greater underestimation of adaptation. Panel B shows the first principal-component score of five measures of financial stress: outstanding debt, the need to borrow under two hypothetical expenditure shocks, financial concern, and self-reported stress. Higher values indicate greater financial stress. Bars report the share of farmers in each score or bin. Dashed lines mark the sample medians; light bars denote observations at or below the median and dark bars denote observations above the median. The sample includes farmers with nonmissing treatment assignment and nonmissing values of the respective moderator.

Appendix C.2. Placebo Heterogeneity

Table C1: Continuous and binary moderator interaction regressions: state-dependent commitment

Moderator	Commit in good state	Commit in bad state
Panel A: Household demographics		
Age (continuous)	-0.004	0.001
	(0.004)	(0.004)
Female	0.237**	0.055
	(0.100)	(0.102)
Household size (continuous)	0.000	0.017
	(0.019)	(0.019)
Children number (continuous)	-0.024	-0.041
	(0.048)	(0.049)
Education level (continuous)	-0.066	-0.062
	(0.041)	(0.040)
Farming occupation	0.035	0.154
	(0.122)	(0.128)
Non-agricultural work	-0.114	-0.125
	(0.103)	(0.104)
Panel B: Agricultural activities		
Owned (continuous)	0.024	0.010
	(0.040)	(0.043)
Cultivated (continuous)	-0.001	-0.039
	(0.045)	(0.047)
Rented (continuous)	-0.004	-0.010
	(0.038)	(0.041)
Total acreage farming (continuous)	-0.009	-0.002
	(0.021)	(0.022)
Farming revenue last season (continuous)	-0.000	0.000
	(0.000)	(0.000)
Panel C: Financial variables		
Usual year income (continuous)	-0.000	-0.000
	(0.000)	(0.000)

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Table C1 continued

Moderator	Commit in good state	Commit in bad state
Usual non-farming year income (continuous)	-0.000	-0.000
	(0.000)	(0.000)
Financial stress index (continuous)	0.068*	0.090**
	(0.040)	(0.040)
Has debts	-0.121	0.026
	(0.123)	(0.126)
Panel D: Logistical variables		
Trust in insurance (continuous)	0.046	-0.014
	(0.040)	(0.040)
Trust in offtaker (continuous)	-0.032	0.027
	(0.055)	(0.052)
Intended selling to offtaker (continuous)	0.004	-0.057
	(0.051)	(0.054)
Actual selling criterion	0.003	-0.113
	(0.122)	(0.124)
Comprehension: premium timing	-0.393	-0.786***
	(0.254)	(0.143)
Comprehension: payment method	–	–
Comprehension: pay-at-harvest	-0.535*	-0.234
	(0.278)	(0.278)
Comprehension: timing across seasons	0.475*	-0.123
	(0.248)	(0.252)
Panel E: Behavioral measures		
Farming risk level (continuous)	0.039	0.047
	(0.051)	(0.052)
Worry about risk (continuous)	-0.051	0.003
	(0.043)	(0.044)
Risk willingness level (continuous)	-0.013	-0.044
	(0.040)	(0.040)

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Table C1 continued

Moderator	Commit in good state	Commit in bad state
Ambiguity comfort level (continuous)	-0.012	0.058
	(0.040)	(0.041)
Peace of mind level (continuous)	-0.050	0.062
	(0.069)	(0.067)
Memory ability level (continuous)	-0.046	-0.014
	(0.049)	(0.051)
Time preference level (continuous)	-0.015	-0.026
	(0.055)	(0.054)
Projection bias score (> median = 0)	0.268**	0.077
	(0.117)	(0.125)

Notes: Entries are treatment-by-moderator interaction coefficients from separate linear probability models, with HC1 robust standard errors in parentheses. Genuine 0/1 moderators enter once, and continuous moderators enter only in their original scale. Projection bias enters only as an indicator equal to one when its value is strictly above the median of the analysis sample; its row label reports the median cutoff. A dash indicates that the interaction is not estimable. * $p<0.10$, ** $p<0.05$, *** $p<0.01$. These regressions are exploratory and do not adjust for multiple testing.

Appendix C.3. Generalized Random Forest Tests

Table C2: Omnibus generalized random forest calibration tests

Outcome	Calibration term	Estimate	SE	p-value
Commit in good state	Mean forest prediction	0.991	0.349	0.002
Commit in good state	Differential forest prediction	-2.433	1.337	0.965
Commit in bad state	Mean forest prediction	0.997	0.492	0.022
Commit in bad state	Differential forest prediction	-2.653	1.618	0.949

Notes: This table reports calibration tests for generalized random forests estimated separately for commitment in the good and bad states. The mean forest prediction term assesses calibration of the average treatment effect. The differential forest prediction term tests whether variation in forest-predicted conditional average treatment effects corresponds to realized treatment-effect heterogeneity.

Table C3: Theory-targeted best linear projections of generalized random forest estimates

Outcome	Moderator	Estimate	95% CI	Raw p	Holm p
Commit in good state	Financial stress index	0.081	[-0.015, 0.178]	0.098	0.196
Commit in good state	Projection bias	0.275	[0.046, 0.504]	0.019	0.076
Commit in bad state	Financial stress index	0.109	[0.012, 0.206]	0.028	0.083
Commit in bad state	Projection bias	0.098	[-0.145, 0.342]	0.430	0.430

Notes: Estimates are changes in the forest-implied treatment effect per listed moderator unit. The financial stress index is expressed in control-group standard deviations. Projection bias is an indicator for values above the sample median. Holm-adjusted p-values control the family-wise error rate across all four outcome-by-moderator tests.

Appendix D. Different Conceptualizations of Sophistication

The main text introduces sophistication parameters λ_α (over state-dependent valuations) and λ_ε (over state-dependent decision quality), and uses them to derive Propositions 1 and 2. This appendix clarifies the modeling choices, links our framework to the canonical β–δ literature, and explains why partial sophistication does not eradicate misbeliefs by itself.

C.1 Sophistication as a second-order object

In the canonical β–δ model of present bias (Laibson, 1997; O'Donoghue and Rabin, 1999), the behavioral distortion ($\beta < 1$) enters the period-t *experienced utility* directly. When making intertemporal decisions, the current self therefore needs to form first-order beliefs about whether future selves will have different preferences when they become "present." Sophistication is, in that setting, a first-order object.

In our framework the state-dependence does not enter experienced utility; it enters *belief formation*. The distorted object is Self 1's forecast of the value of insurance, not the value of insurance itself. Because the commitment decision is about future payments and payouts, the relevant question is what Self 1 believes about Self 2's *forecasts*. Sophistication is therefore inherently a *second-order* object: a belief about one's own future first-order beliefs.[38]

This distinction has two implications that recur throughout the appendix. First, it gives sophistication an empirical role at *both* the current and the future stage (Section C.2). Second, it means that "sophistication" as parameterized by λ_α does not collapse to rational expectations even at $\lambda_\alpha = 1$ (Section C.3).

C.2 Current vs. future state-dependent valuations

The second-order character of sophistication opens a conceptual separation that has no analog in the β–δ model: between (i) awareness of one's *current* state-dependent valuations and (ii) sophistication about one's *future* state-dependent valuations. In β–δ, the period-t objective already incorporates the bias, so sophistication is defined only over future selves and (i) has no empirical content. In our setting, by contrast, an agent could in principle correct partly for projection bias when forming today's forecast (an attenuation of the current α) while still anticipating that their future self will not so correct (a positive λ_α).

Loewenstein et al. (2003) highlight this subtlety in their original formulation:

> "[O]ne could imagine a variant of the model where the person is aware of their future propensity to mispredict. She could, for instance, be aware of their general propensity to overshop

[38] Our approach is therefore related to Madarász et al. (2023), which models projective thinking as a second-order belief that strikes a balance between full sophistication and naivety in an interpersonal setting.

> when hungry, while still committing the error on a case-by-case basis. The coexistence of day-to-day mispredictions with a 'meta-awareness' of these mispredictions is similar to the discussion in O'Donoghue and Rabin [1999b] of how people can simultaneously be aware of their general tendency to procrastinate and yet still procrastinate on a case-by-case basis."

Our model parameterizes only (ii). To the extent that current awareness induces partial correction or counteracting behavior, it shows up as a reduced-form attenuation of the current projection weight α (see Kaufmann, 2022). Because the commitment decision depends on beliefs about how renewal-stage valuation will differ from today's benchmark, it is the sophistication about the *future* tendency that is central.[39] Changes in current awareness primarily shift the level of state dependence in valuations today; the wedge that drives the commitment decision is the gap between today's forecast and the anticipated future forecast.

This modeling choice has a practical consequence: an intervention designed to raise λ_α (sophistication about future state dependence) may inevitably also raise current awareness and hence reduce the effective α. However, our model bounds this concern because an increase in current awareness *alone* cannot generate demand for commitment. From the recursive structure of $\widehat{\Delta}_2^2(h_2)$ in the main text, when $\lambda_\alpha = 0$ Self 1's belief about Self 2's renewal-stage forecast collapses to Self 1's own first-order forecast—no matter how distorted, or how attenuated by current awareness, that forecast happens to be. No wedge opens between Self 1 and their belief about Self 2, so Self 1 has no reason to commit. A shift in current awareness can therefore show up only as attenuated state dependence in *current* insurance demand, never as a change in the commitment choice. To the extent that we observe the intervention raising commitment empirically, the effect must operate at least partly through λ_α.

We can additionally check whether current awareness is moving alongside λ_α, in two complementary ways. First, one could ask farmers after treatment whether they perceive their *current* valuation of insurance as having been influenced by the just-realized harvest; a shift in those answers would directly indicate movement in current awareness. Second, if the intervention reduces the effective α, then treated farmers' first-season insurance take-up should be less sensitive to recent weather realizations than that of control farmers; an absence of such a treatment-by-weather interaction in current insurance demand provides no evidence of a current-awareness shift. We report both checks in Section 5.3.

C.3 Why sophistication does not eradicate the underlying bias

A related worry is that as λ_α rises toward one, sophistication should mechanically eliminate the projection bias—in which case neither commitment nor flexibility would have a clear theoretical

[39] Our notion of sophistication coincides with the nonparametric behavioral characterization of sophistication: the ex-ante demand for a smaller menu—that is, commitment (Ahn et al., 2019).

grounding. As discussed in the previous section, sophistication about current and future state-dependent valuations are distinct objects and not necessarily fully correlate.

The intuition mirrors that of partial sophistication in other settings. For example, in the context of endowment effect and collateralized loans, Carney et al. (2022) find that "participants are partially naive about the endowment effect, understanding that they will become attached to the endowed item over the course of a week but not recognizing the full strength of their attachment." In our setting, a farmer can grasp in the abstract that "people tend to undervalue insurance after a good harvest" while still failing to fully unwind that distortion when forecasting their own future evaluation: they have no rational benchmark to substitute, only their own current (already distorted) forecasting rule. Awareness of a tendency is not the same as having access to a state-free baseline preference. This is the meaning of *partial* sophistication: the farmer anticipates the *direction* of the future shift, but not the full magnitude, and therefore their forecast remains anchored to the current view.

Formally, this property is built into the recursive structure of the main-text equation

$$\begin{aligned}\widehat{\Delta}_2^2(h_2) &= \hat{\alpha}\,\Delta(s_1,h_1) + (1-\hat{\alpha})\mathbb{E}[\tilde{\Delta}_1^2(h_1)] \\ &= \lambda_\alpha \alpha\,\Delta(s_1,h_1) + (1-\lambda_\alpha\alpha)(\alpha\,\Delta(s_0) + (1-\alpha)\mathbb{E}[\Delta(s_2,h_2)])\end{aligned}$$

Even at $\lambda_\alpha = 1$, the residual weight $(1-\hat{\alpha}) = (1-\alpha)$ falls on Self 1's *own* period-1 forecast $\mathbb{E}[\tilde{\Delta}_1^2(h_1)]$, which is itself distorted by α. Self 1 anticipates that Self 2 will tilt toward the realized s_1, but the rest of Self 2's forecast is, in Self 1's eyes, the same forecast Self 1 themselves use today. The bias is partially, not fully, removed. By contrast, in β–δ the natural sophistication parameterization $\hat{\beta} = 1$ mechanically delivers time-consistent behavior, because the bias enters the period-t objective itself rather than the forecast. That discontinuity would be conceptually awkward here: it would amount to Self 1 believing that Self 2 will form "rational" forecasts that Self 1 does not themselves hold today.

C.4 Recursive vs. rational-residual formulations

A reader might consider two natural alternatives to the recursive formulation we adopt:

Cross-state-only sophistication. An alternative places the residual $(1-\hat{\alpha})$ on the rational expectation rather than on Self 1's distorted forecast:

$$\widehat{\Delta}_2^{2,\text{alt}}(h_2) = \hat{\alpha}\,\Delta(s_1,h_1) + (1-\hat{\alpha})\mathbb{E}[\Delta(s_2,h_2)].$$

This formulation captures cross-state conflict (Self 1 in state s_0 forecasts how Self 2 in state s_1 will behave) but generates no within-state, across-time conflict. Because the commitment decision is inherently intertemporal, we view this as too restrictive. It would also correspond to a more extreme form of *hypersophistication* than our setting calls for: Self 1 fully debiases their own current forecast while still expecting Self 2 to be biased at renewal.

Convex combination of anchors. A second alternative places the projection-bias anchor on a λ_α-weighted average of $\Delta(s_0)$ and $\Delta(s_1, h_1)$:

$$\widehat{\Delta}_2^{2,\text{conv}}(h_2) = \alpha\big(\lambda_\alpha \Delta(s_1, h_1) + (1-\lambda_\alpha)\Delta(s_0)\big) + (1-\alpha)\mathbb{E}[\Delta(s_2, h_2)].$$

Here $\lambda_\alpha = 0$ recovers Self 1's current forecast (Self 2 is anchored to today's $\Delta(s_0)$) and $\lambda_\alpha = 1$ shifts the anchor entirely to the realized $\Delta(s_1, h_1)$. This form is simpler and avoids the recursive product $\lambda_\alpha \alpha$. Its drawback is that at $\lambda_\alpha = 1$ it implies the same kind of *hypersophistication*.

Importantly, both alternative approaches combine, in a single parameter, both (i) debiasing of current state-dependent valuations and (ii) sophistication about future state-dependent valuations—two distinct objects we keep separate in C.2. We adopt the recursive formulation in the main text because it cleanly isolates (ii) while preserving the partial-sophistication property of C.3. The two alternatives nest inside richer specifications and could be useful in settings where additional debiasing is plausible *a priori*.

C.5 Prediction, endorsement, and the meaning of λ_α

The main text uses λ_α to capture sophistication about undesirable future state-dependent valuations. This object can be conceptually decomposed into two components, just like sophistication about self-control can be measured as the difference between two components (e.g., Ameriks et al., 2007) . The first is predictive: Self 1 anticipates that Self 2's renewal-stage valuation will be pulled toward the realized harvest state. The second is normative: Self 1 regards this pull as an inappropriate basis for the renewal decision, rather than as useful state-contingent information.

A richer model could separate these two components, such that one denotes the raw predicted extent of future projection, and the other denotes the extent to which Self 1 treats that future state dependence as unendorsed. Without any of them, there won't be a demand for commitment. For example, if Self 1 anticipates future state dependence but endorses it as a legitimate response to the realized state, it belongs to the option-value logic of flexibility rather than to the commitment motive. If Self 1 dislikes state dependence in principle but does not expect it to affect future behavior; again no commitment wedge arises. Commitment demand is generated when both components are present. We keep the single-parameter representation in the main text and view our experiment as testing the joint roles of sophistication and normative attitudes toward state dependence in generating demand for commitment.

C.6 No analogous current-sophistication for decision quality

The decision-quality channel modeled in Section 2 does not require a parallel current-vs-future distinction. This is because the decision-quality shock e_t enters the period-t objective directly, in the same way β enters the period-t objective in the β–δ model. Sophistication about the *current* shock therefore has no empirical content—the current self's behavior already incorporates whatever attention level is realized today, and there is no separate "forecast of today's attention" to be sophisticated or naive about. We therefore parameterize only sophistication about the future shock, λ_ε, and the structure of the formal results parallels what would emerge in a β–δ model of decision quality.

We did assume that the decision-quality shock affects only the agent's *contemporaneous* insurance decision but does not distort the evaluation of other objects. This means that the decision-quality shock does not distort the evaluation of the desirability of commitment, the reliability of one's judgment, or the interpretation of the state itself. This is the case, for instance, if Self 1 chooses between commitment and flexibility in a relatively "cold" and deliberative environment. At this time, the farmer is not under immediate liquidity pressure and hence can plan without being influenced by the decision quality shock. Under this restriction, the decision-quality shock at $t = 1$ primarily introduces noise into insurance take-up for $t = 1$, whereas the consequences of decision-quality shocks at $t = 2$ are central for the value of flexibility and thus for demand for commitment.

Appendix E. Proofs

Appendix E.1. Necessity and Sufficiency of the Conditions

As shown below, the conditions proposed in the main text to bound the interaction between two channels are both necessary and sufficient for global monotonicity.

Lemma 1 (Bounding over-purchase on average)**.** *For fixed α and h_1, $\widetilde{OV}$ is weakly decreasing in λ_ε for every $\lambda_\alpha \in [0,1]$ if and only if condition (14) holds.*

Proof. For fixed λ_α, differentiating equation (10) with respect to λ_ε:

$$\frac{\partial \widetilde{OV}(h_1;\lambda_\alpha,\lambda_\varepsilon)}{\partial \lambda_\varepsilon} = -\mathbb{E}_{h_2|h_1}\left[\varepsilon_{s_1}\mathbb{E}[\tilde{\Delta}_1^2 \mid h_2]\mathbf{1}\{\widehat{\Delta}_2^2(\lambda_\alpha) > 0\}\right]. \tag{19}$$

The expectation on the right is weakly decreasing in λ_α. To see this, consider all four cases:

1. If $s_1 = G$ and $\mathbb{E}\big[\tilde{\Delta}_1^2 \mid h_2\big] \geq 0$, increasing λ_α pulls $\widehat{\Delta}_2^2$ toward $\Delta(G, h_1) < 0$. It may therefore switch the renewal decision from purchase to no purchase. RHS expectation is decreasing.
2. If $s_1 = G$ and $\mathbb{E}\big[\tilde{\Delta}_1^2 \mid h_2\big] < 0$, both $\mathbb{E}\big[\tilde{\Delta}_1^2 \mid h_2\big]$ and $\Delta(G, h_1)$ are negative, so Self 2 never purchases and Self 1 never wanted it. RHS expectation is constant.
3. If $s_1 = B$ and $\mathbb{E}\big[\tilde{\Delta}_1^2 \mid h_2\big] \geq 0$, both $\mathbb{E}\big[\tilde{\Delta}_1^2 \mid h_2\big]$ and $\Delta(B, h_1)$ are non-negative, so Self 2 continues to purchase and Self 1 wanted it anyway. RHS expectation is constant.
4. If $s_1 = B$ and $\mathbb{E}\big[\tilde{\Delta}_1^2 \mid h_2\big] < 0$, increasing λ_α pulls $\widehat{\Delta}_2^2$ toward $\Delta(B, h_1) > 0$. It may therefore switch the renewal decision from no purchase to purchase. RHS expectation is decreasing.

The RHS expectation therefore attains its minimum, i.e., the equation (19) attains its maximum, at $\lambda_\alpha = 1$. Condition (14) is consequently sufficient for (19) to be weakly negative at every λ_α, and necessity follows by evaluating the derivative at $\lambda_\alpha = 1$. □

Lemma 2 (Bounding over-purchase on statewise)**.** *Condition (16) is necessary and sufficient for both of the following statements to hold globally:*

(i) *$\widetilde{OV}^B$ is independent of λ_α for every λ_ε;*

(ii) *in either state, $\widetilde{OV}^{s_1}$ is weakly decreasing in λ_ε for every λ_α.*

Proof. The proof follows a similar spirit, state-wise. For (i),

1. If $s_1 = B$ and $\mathbb{E}\big[\tilde{\Delta}_1^2 \mid h_2\big] \geq 0$, both $\mathbb{E}\big[\tilde{\Delta}_1^2 \mid h_2\big]$ and $\Delta(B, h_1)$ are non-negative, so renewal is anticipated for every λ_α. $\widetilde{OV}^B$ is constant.

2. If $s_1 = B$ and $\mathbb{E}\big[\tilde{\Delta}_1^2 \mid h_2\big] < 0$, the renewal indicator is weakly increasing in λ_α. For $\widetilde{OV}^B$ to be constant, the indicator needs to remain zero globally. This is the case when it is zero at $\lambda_\alpha = 1$, which is the bad-state instance of condition (16).

For (ii), differentiating (15) gives

$$\frac{\partial \widetilde{OV}^{s_1}(h_1;\lambda_\alpha,\lambda_\varepsilon)}{\partial \lambda_\varepsilon} = -\varepsilon_{s_1}\mathbb{E}[\tilde{\Delta}_1^2 \mid h_2]\mathbf{1}\{\widehat{\Delta}_2^2(\lambda_\alpha) > 0\}. \tag{20}$$

This is weakly negative for every λ_α exactly when every anticipated purchase is weakly preferred. By a similar case analysis, it is necessary and sufficient to check this requirement at $\lambda_\alpha = 1$. □

Appendix E.2. Proofs of the Main-Text Propositions

Proof of Proposition 1. For Part (i), at $(\lambda_\alpha,\lambda_\varepsilon) = (0,0)$,

$$\widehat{\Delta}_2^2(0) = \mathbb{E}[\tilde{\Delta}_1^2 \mid h_2].$$

Hence Self 1 expects Self 2 to implement exactly Self 1's preferred decision. More explicitly,

$$D(h_1;0,0) = \mathbb{E}_{h_2|h_1}\Big[\max\{\mathbb{E}[\tilde{\Delta}_1^2 \mid h_2],0\} - \mathbb{E}[\tilde{\Delta}_1^2 \mid h_2]\mathbf{1}\{\mathbb{E}[\tilde{\Delta}_1^2 \mid h_2] > 0\}\Big] = 0.$$

It follows that $\widetilde{OV}(h_1;0,0) = OV^\alpha(h_1) \geq 0$.

For Part (ii), monotonicity in λ_α, fix a history h_2. There are four cases:

1. If $s_1 = G$ and $\mathbb{E}\big[\tilde{\Delta}_1^2 \mid h_2\big] \geq 0$, increasing λ_α pulls $\widehat{\Delta}_2^2$ toward $\Delta(G,h_1) < 0$. It may therefore switch the renewal decision from purchase to no purchase, which weakly lowers Self 1's payoff from flexibility $\widetilde{OV}$.
2. If $s_1 = G$ and $\mathbb{E}\big[\tilde{\Delta}_1^2 \mid h_2\big] < 0$, both $\mathbb{E}\big[\tilde{\Delta}_1^2 \mid h_2\big]$ and $\Delta(G,h_1)$ are negative, so Self 2 never purchases and the payoff is unchanged.
3. If $s_1 = B$ and $\mathbb{E}\big[\tilde{\Delta}_1^2 \mid h_2\big] \geq 0$, both $\mathbb{E}\big[\tilde{\Delta}_1^2 \mid h_2\big]$ and $\Delta(B,h_1)$ are non-negative, so Self 2 continues to purchase and the payoff is unchanged.
4. Finally, if $s_1 = B$ and $\mathbb{E}\big[\tilde{\Delta}_1^2 \mid h_2\big] < 0$, increasing λ_α may switch the renewal decision from no purchase to purchase. Because Self 1 values insurance negatively in that history, this switch weakly lowers Self 1's payoff.

Thus, for each history the payoff from flexibility is weakly decreasing in λ_α. The perceived value of flexibility is therefore weakly decreasing in λ_α also in expectation.

Part (iii) follows from Lemma 1. □

Proof of Proposition 2. After a good state, $\Delta(G,h_1)<0$, so increasing λ_α pulls $\widehat{\Delta}_2^2(\lambda_\alpha)$ downward and can only reduce the probability of renewal. The perceived value of flexibility $\widetilde{OV}^G(h_1;\lambda_\alpha,\lambda_\varepsilon)$ therefore weakly decreases in λ_α, irrespective of the condition (16).

The other half of the λ_α comparative statics follows from Lemma 2.

The global monotonicity in λ_ε also follows from Lemma 2. Where renewal is anticipated, equation (20) reduces to

$$-\varepsilon_{s_1}\mathbb{E}[\tilde{\Delta}_1^2 \mid h_2].$$

Thus the direct good-state effect is negligible when $\varepsilon_G \approx 0$. When $\varepsilon_B > 0$, the bad-state effect is strictly negative whenever $\mathbb{E}[\tilde{\Delta}_1^2 \mid h_2] > 0$ and renewal is anticipated. □

Appendix E.3. Heterogeneity Regarding α

The following corollary considers the history most directly related to our empirical test of α heterogeneity. In the experiment, commitment that binds after a good first-season harvest prevents the farmer from cancelling insurance following precisely the realization under which state-dependent valuations may push for underinsurannce. The conditions below focus on cases in which Self 1 values continued coverage positively and its state-contingent expected value remains nonnegative.

Corollary 1 (Heterogeneity regarding α / state-dependent valuation)**.** *Consider a good-state history $h_2=(h_1,G)$ at which $\mathbb{E}[\tilde{\Delta}_1^2 \mid h_2]>0$, $V(h_2)\geq 0$, and $\alpha>0$.*

Define

$$\bar{\lambda}_\alpha = \frac{\mathbb{E}[\tilde{\Delta}_1^2 \mid h_2]}{\alpha\left(\mathbb{E}[\tilde{\Delta}_1^2 \mid h_2]-\Delta(G,h_1)\right)} \tag{21}$$

is such that, suppose $\bar{\lambda}_\alpha \in (0,1)$, or equivalently that $\widehat{\Delta}_2^2(1)<0$, Self 1 anticipates renewal when $\lambda_\alpha < \bar{\lambda}_\alpha$. Then this threshold $\bar{\lambda}_\alpha$ is strictly decreasing in α. Locally around the renewal threshold, greater α therefore makes a given increase in valuation sophistication more likely to generate commitment demand.

Proof. At the stated history, $\widehat{\Delta}_2^2(\lambda_\alpha)$ is strictly decreasing in λ_α. Solving $\widehat{\Delta}_2^2(\lambda_\alpha)=0$ gives (21).

Direct differentiation of the right-hand side of (21) with respect to α gives

$$\frac{\Delta(G,h_1)V(h_2)-\left(\mathbb{E}[\tilde{\Delta}_1^2 \mid h_2]\right)^2}{\alpha^2\left(\mathbb{E}[\tilde{\Delta}_1^2 \mid h_2]-\Delta(G,h_1)\right)^2}<0.$$

The inequality follows from $\Delta(G,h_1)<0$, $V(h_2)\geq 0$, and $\mathbb{E}[\tilde{\Delta}_1^2 \mid h_2]>0$. □

Note that this heterogeneity is only local because anticipated renewal changes discretely only when λ_α crosses the threshold. Far below the threshold, an increase in sophistication is insufficient to change the anticipated renewal decision; far above it, nonrenewal is already anticipated, leaving no additional response. Thus, although greater α lowers the threshold, it need not generate a larger treatment effect throughout the parameter space: the strongest response arises among farmers whose thresholds lie between their pre- and post-intervention levels of sophistication. A global heterogeneity result would therefore require additional assumptions about the joint distribution of state-dependent valuation α, baseline valuation sophistication λ_α, and histories.

Appendix E.4. Heterogeneity Regarding ε_s

The following corollary formalizes the corresponding heterogeneity for state-dependent decision quality. At a history where Self 1 values insurance positively and anticipates renewal, a future decision quality shock causes Self 2 to forgo insurance that Self 1 would prefer to keep. The expected cost of this shock is proportional to both sophistication, λ_ε, and the state-specific shock probability, ε_{s_1}. An increase in decision-quality sophistication therefore reduces the value of flexibility more strongly among farmers who are more likely to experience such failures.

Corollary 2 (Heterogeneity regarding ε_s / state-dependent decision quality)**.** *Under condition* (16), *for each state* s_1,

$$\frac{\partial^2 \widetilde{OV}^{s_1}(h_1;\lambda_\alpha,\lambda_\varepsilon)}{\partial\lambda_\varepsilon\,\partial\varepsilon_{s_1}} = -\mathbb{E}[\tilde{\Delta}_1^2 \mid h_2]\mathbf{1}\{\widehat{\Delta}_2^2(\lambda_\alpha) > 0\} \leq 0.$$

The inequality is strict whenever Self 1 strictly values insurance and anticipates renewal. Holding Self 1's valuation and anticipated renewal fixed, decision-quality sophistication therefore creates a stronger force toward commitment for farmers with a higher state-specific failure rate.

Proof. Differentiate equation (15) first with respect to λ_ε and then with respect to ε_{s_1}. Condition (16) signs the result; strictness follows when $\mathbb{E}[\tilde{\Delta}_1^2 \mid h_2] > 0$ and the indicator equals one. □

At a fixed history, this interaction is global because λ_ε and ε_{s_1} enter the expected loss from flexibility multiplicatively. Translating this result into observed commitment choices nevertheless introduces a threshold: a farmer changes choices only if the resulting decline in the value of flexibility crosses zero. Farmers with very high shock probabilities may already demand commitment, whereas those with very low probabilities may remain below the commitment threshold even after becoming more sophisticated.

Note that to generate selectively greater demand for commitment after a bad harvest, the probabilities of decision quality shock need to be state-dependent. Thus, if $\varepsilon_B \approx \varepsilon_G > 0$, valuations and anticipated renewal are comparable across states, decision-quality sophistication would generate similar forces toward commitment after good and bad harvests. The model would then predict greater demand for commitment that binds in both states, rather than a concentration of commitment against scarcity-induced shocks after bad harvests.

Appendix F. Treatment Survey Script

This appendix reproduces the respondent-facing treatment script. The script is organized around the three components described in the paper: mental simulation of good and bad harvest states (order randomized), existing evidence of state-dependent insurance decisions, and a balanced discussion of flexibility versus commitment.

Appendix F.1. Mental Simulation of Harvest States

Introduction.

> *Enumerator reads aloud:* Let's continue to run through some hypothetical scenarios, where you had pay-at-harvest insurance so that you do not have to pay for the premiums upfront. Please consider the insurance product with the terms that we mentioned in the previous section. In each scenario, you are about to decide whether to keep the insurance in future seasons or to cancel it. Each scenario will be different. So please listen to the description carefully and consider each situation independently and not as the last completed crop season.

Bad Season Scenario

Expectations about the next season.

> Imagine that you just had a bad season because of a drought, and your crops suffered a major loss. How will this affect your expectations, immediately afterwards, about the next season?

Response options:

- −2 = much more likely future seasons are bad
- −1 = more likely future seasons are bad
- 0 = expectations will remain unchanged
- 1 = more likely future seasons are good
- 2 = much more likely future seasons are good

Judgment about expectations.

> Imagine that, after experiencing a bad season, someone believes that the next season will be as bad as the last one. Do you think this is the correct way of thinking?

Response options: Scale from 1 to 5, where 1 is "Very incorrect" and 5 is "Very correct."

Cancellation decision.

> Imagine you have already had PAH insurance for multiple seasons. You just had a bad season because of a drought, and your crops suffered a major loss. Because you had PAH insurance

in the past season, you received a payout from the insurance company and were compensated for the loss. As the premium is deducted at harvest from your crop sale payment, you were also able to afford the insurance product despite the bad season. To plan ahead, if you have the option to revisit your insurance at this point, would you want to cancel the multi-season PAH insurance for the next season?

Response options:

- Yes
- No

Reason for cancellation choice.

If respondent answers yes: Why would you want to cancel PAH insurance after having experienced a bad season?

If respondent answers no: Why wouldn't you want to cancel PAH insurance after having experienced a bad season?

Response option: Open response.

Valuation of PAH insurance.

How does having just experienced a bad season affect your valuation about PAH insurance the next season?

Response options:

- -2 = will value PAH insurance much less
- -1 = will value PAH insurance less
- 0 = no influence on my valuation about PAH insurance
- 1 = will value PAH insurance more
- 2 = will value PAH insurance much more

Decision-making capacity.

How does having just experienced a bad season affect your ability or capacity to make important decisions (e.g., about farming or insurance)?

Response options:

- -1 = I will make worse decisions
- 0 = no influence on decisions
- 1 = I will make better decisions

Financial stress.

> How does having just experienced a bad season affect your desire to cancel PAH insurance due to financial stress? Remember, in general, people don't have to pay upfront for PAH insurance: the fee is deducted from revenues at the end of the season, so not having the cash to pay for it should in principle not be a consideration.

Response options:

- −2 = much less likely to cancel PAH insurance due to financial stress
- −1 = less likely to cancel PAH insurance due to financial stress
- 0 = no influence in canceling PAH insurance due to financial stress
- 1 = more likely to cancel PAH insurance due to financial stress
- 2 = much more likely to cancel PAH insurance due to financial stress

Judgment on desirability:.

> Do you think it is a good decision to cancel PAH insurance after a bad season in which you received payouts?

Response options:

- Yes
- No

> Why do you think so?

Response option: Open response.

Prevention strategies.

> *If respondent does not think it is a good idea to cancel insurance:* Given that you don't think it is a good idea to cancel insurance, after reflecting on factors in a bad season that may compel you to cancel, what can you do to prevent yourself from regretting your choice?

Response options; multiple selections possible:

- Save more money
- Remove the option to revisit the contract midway
- Rely on communities to support each other
- Apply for some loans or grants
- Pay more attention to season forecasts
- Other, please specify

Good Season Scenario

Expectations about the next season.

Let's proceed to the next set of scenarios, which has nothing to do with the previous ones.

Imagine that you just had a good season: the rainfall was just right, you produced more than usual, and you sold it at a high price. How will this affect your expectations, immediately afterwards, about the next season?

Response options:

- -2 = much more likely future seasons are bad
- -1 = more likely future seasons are bad
- 0 = expectations will remain unchanged
- 1 = more likely future seasons are good
- 2 = much more likely future seasons are good

Judgment about expectations.

Imagine that, after experiencing a good season, someone believes that the next season will be as good as this one. Do you think this is the correct way of thinking?

Response options: Scale from 1 to 5, where 1 is "Very incorrect" and 5 is "Very correct."

Cancellation decision.

Imagine you have already had PAH insurance for multiple seasons. You just had a good season: you produced more than usual and sold it at a high price. Although you had PAH insurance in the past season, you would not receive any compensation because your harvest was good. Moreover, you would still need to pay the premium as a deduction from your revenue at the harvest. To plan ahead, if you have the option to revisit your insurance at this point, would you want to cancel the multi-season PAH insurance for the next season?

Response options:

- Yes
- No

Reason for cancellation choice.

If respondent answers yes: Why would you want to cancel PAH insurance after having a very good season?

If respondent answers no: Why wouldn't you want to cancel PAH insurance after having a very good season?

Response option: Open response.

Valuation of PAH insurance.

> How does having just experienced a good season affect your valuation about PAH insurance for the next season?

Response options:

- -2 = will value PAH insurance much less
- -1 = will value PAH insurance less
- 0 = no influence on my valuation about PAH insurance
- 1 = will value PAH insurance more
- 2 = will value PAH insurance much more

Decision-making capacity.

> How does having just experienced a good season affect your ability or capacity to make important decisions (e.g., about farming or insurance)?

Response options:

- -1 = I will make worse decisions
- 0 = no influence on decisions
- 1 = I will make better decisions

Financial stress.

> How does having just experienced a good season affect your desire to cancel PAH insurance due to financial stress? Remember, in general, people don't have to pay upfront for PAH insurance: the fee is deducted from revenues at the end of the season, so not having the cash to pay for it should in principle not be a consideration.

Response options:

- -2 = much less likely to cancel PAH insurance due to financial stress
- -1 = less likely to cancel PAH insurance due to financial stress
- 0 = no influence in canceling PAH insurance due to financial stress
- 1 = more likely to cancel PAH insurance due to financial stress
- 2 = much more likely to cancel PAH insurance due to financial stress

Judgment on desirability:.

> Do you think it is a good decision to cancel PAH insurance after a good season in which you don't receive any payouts?

Response options:

- Yes
- No

> Why do you think so?

Response option: Open response.

Prevention strategies.

> *If respondent does not think it is a good idea to cancel insurance:* Given that you don't think it is a good idea to cancel insurance, after reflecting on factors in a good season that may compel you to cancel, what can you do to prevent yourself from regretting your choice?

Response options; multiple selections possible:

- Save more money
- Remove the option to revisit the contract midway
- Rely on communities to support each other
- Apply for some loans or grants
- Pay more attention to season forecasts
- Other, please specify

Appendix F.2. Existing Evidence of State-Dependent Insurance Decisions

State-dependent insurance demand.

> We have just gone through various scenarios where you may have realized that the previous season may affect your desire to cancel the insurance.
>
> Relatedly, many studies investigate how decisions about whether or not to purchase crop insurance vary from year to year among smallholder farmers like yourself. These studies have indeed typically found that whether there was a good or a bad harvest the previous season matters a lot.
>
> In some studies, farmers are substantially more likely to buy insurance if they had poor rainfall in the previous season, if they received a payout from the insurance in the previous season, or if their friends received a payout in the previous season. In contrast, they are less likely to buy insurance if they previously had a very good season.
>
> To what extent do you think the above description applies to you?

Response options:

- 0 = not at all
- 1 = slightly
- 2 = moderately
- 3 = quite a lot
- 4 = completely

Financial stress and decision quality.

> However, the effect of the previous season may be different. In some other studies, farmers get very stressed about their personal finances after a season with poor rainfall. In turn, they may either make worse decisions or reprioritize spending in other aspects of their lives due to worsened circumstances. This may make them less likely to buy insurance after a very bad season.
>
> To what extent do you think the above description applies to you?

Response options:

- 0 = not at all
- 1 = slightly
- 2 = moderately
- 3 = quite a lot
- 4 = completely

Judgment about state-dependent decisions.

> In the context of these studies, people generally think that having crop insurance is beneficial.
>
> With that in mind, do you think people are making a good or bad decision by letting what happened last season influence their insurance choice?

Response options:

- 1 = a very good decision
- 2 = a somewhat good decision
- 3 = neither a good nor a bad decision
- 4 = a somewhat bad decision
- 5 = a very bad decision

Appendix F.3. Flexibility Versus Commitment

Balanced discussion.

> After the discussion about how the previous season may affect your desire to cancel the insurance, you may be wondering about the pros and cons of the option to revisit your PAH insurance at the end of the first crop season.

Keeping the option to revisit gives you the flexibility to cancel your insurance midway when you change your mind. This flexibility is valuable if you think those changes are good decisions. For instance, as each season may be different, if people had a good harvest, they may have enough money to deal with future shocks with their own money and consider crop insurance no longer valuable for them. Alternatively, if people had a bad harvest, they may feel financial stress and want to reprioritize their overall spending. Either way, if they had the option to revisit their contract at that point, they could then cancel insurance for future seasons if they want to.

On the other hand, removing the option to revisit midway is like a commitment that gives you control today over your future decisions. This may be valuable if today you think you might be compelled to make a bad decision when a future season is different. Consider the previous example again. When people had a good harvest, they may forget about the challenges of poor harvests, or think that future seasons will also be good and that crop insurance is no longer useful. Alternatively, when people had a bad harvest, they may be under financial stress and thus make worse decisions about insurance. Either way, this way of thinking can lead to people buying less insurance than they actually need for the upcoming seasons. If this is the case, committing to removing the option to revisit your insurance at a certain point may be valuable because it prevents you from canceling insurance in response to a single season.

As you can see from these points, keeping or removing the option to revisit your insurance can be valuable depending on what you want, and only you know what is best for you. It is important that you think through the relative benefits of these two choices.

Enumerator: pause and make sure the respondent is taking the time to reflect.

State in which cancellation is more likely.

After which season do you think you are more likely to want to cancel the multi-season PAH contract midway?

Response options:

- More likely to want to cancel after a good season
- Equally likely to want to cancel after both seasons
- More likely to want to cancel after a bad season

Benefits and costs of commitment for most people.

Think about the benefits (e.g., enforcing certain decisions) and costs (e.g., less flexibility) of commitment. For most people, do you think the benefits of commitment are greater, the costs are greater, or are they equally important?

Response options:

- -1 = costs of commitment are greater
- 0 = benefits and costs are equally important
- 1 = benefits of commitment are greater

Benefits and costs of commitment for the respondent.

> How about you? For you personally, do you think the benefits of commitment are greater, the costs are greater, or are they equally important?

Response options:

- -1 = costs of commitment are greater
- 0 = benefits and costs are equally important
- 1 = benefits of commitment are greater