Do No Harm: Evaluating the Welfare Effects of Behavioral Insurance Interventions in Ethiopia

Research Proposal

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Total project budget: $355,164
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Abstract

We apply two insights into the behavioral economics of index insurance to try to improve the products that are being offered. The first insight is a recognition that many of the conventional, **observable measures of individual welfare, such as product take-up, are not in fact measuring welfare** when we allow for the preferences and beliefs that are actually driving choices to purchase or not. A corollary of this insight is to ensure that we include the welfare effects of those that do not purchase the insurance, rather than just those that do. The second insight is that **heterogeneity of welfare impact might be a general basis for normatively designing better, conditional interventions**. Rather than just providing one-size-fits-all interventions, our behavioral interventions will be tailored to provide specific interventions designed for the behavioral characteristics of those making insurance decisions. These are "behaviorally smart" conditional interventions, not unconditional "nudges." These insights are applied in the field to establish a **"proof of concept," using an Index Based Livestock Insurance product for pastoralists in Ethiopia**. This is a setting and product that our team has long, established familiarity with, making it easier to reliably apply these new insights.

Narrative Description

The rapid expansion of access to, and promotion of, financial products such as insurance, especially in developing countries, low levels of financial literacy, and increasing complexity of products, raises serious concerns about the extent to which the demand for these products increases expected surplus, or welfare, for consumers. Most studies of insurance commonly focus on take-up (Cole et al., 2013, 2014; Casaburi and Willis, 2018), enhanced productive investments (Karlan et al. 2014), or changes to coping strategies as their primary outcome. However, this approach assumes that client behavior reflects a full and accurate understanding of the risks to which consumers are exposed and the products that they have purchased. Harrison and Ng (2016), Carter and Chiu (2018) and Harrison (2019) have argued forcefully that policy-makers interested in using insurance products to serve risk management objectives must evaluate their effects on expected consumer surplus. These effects are not indirect or incidental: they are fundamental to whether these products improve or reduce the welfare of consumers.

To evaluate these welfare effects, rather than only focusing on indirect proxies of welfare, requires measurement of consumer's preferences and subjective beliefs through theory and carefully designed tasks with incentives. Risk preferences, time preferences, and subjective beliefs are latent, and cannot be directly observed. Consumer preferences, such as attitudes to risk and time, are also heterogeneous, and there exist optimal financial decisions that maximize welfare in terms of these preferences. Hence the quality of insurance products and interventions that promote insurance must be evaluated in terms of effects on individual consumer welfare. If we take the motto "do no harm" seriously, we must evaluate these effects on the welfare of individuals.

The manner in which consumer surplus can be measured behaviorally is demonstrated in "proof of concept" laboratory experiments by Harrison and Ng (2016)(2018) and Harrison, Martínez-Correa, Ng and Swarthout (2019). The method relies on estimating the preferences and subjective beliefs of subjects who make insurance purchase decisions in the lab in which the relevant insurance parameters (e.g. endowments, losses, loss probabilities) are varied. For each insurance decisions it is possible to establish if those that *do* purchase might have made the right decision, given their preferences and beliefs, and generated a *positive* expected Consumer Surplus (CS). Or they might have made the wrong decision, given their preferences and beliefs, and generated a *negative* expected CS. Similarly, those that *do not* purchase insurance when given the chance might have made the right decision, given their risk preferences and beliefs; or they might have made the wrong decision, given their risk preferences and beliefs. Hence welfare gains and losses are not restricted to those that purchase the product: one has to consider, as well, those that do not purchase the product.

Our first major contribution is to be the **first study to test this "proof of concept" in the field**, in an experiment with an Index Based Livestock Insurance (IBLI) product for pastoralists in Ethiopia. IBLI was designed to cushion households against drought-related losses, so as to accelerate recovery from shocks, build households resilience to drought, and avert collapses into poverty traps (Chantarat et al. 2013). High rates of uptake have been observed for IBLI in southern Ethiopia, along with high rates of attrition (Takahashi et al. 2016). Subjective well-being

impacts from IBLI uptake (Tafere et al. 2019), suggest that pastoralists in the region see considerable prospective gains from IBLI, on average, but also that these benefits are heterogeneous. Are these observations consistent with our team's laboratory experiments that establish how the framing of insurance purchase decisions, and specific characteristics of sub-groups of consumers, significantly influence the extent to which individuals "win" or "lose" from purchasing or not purchasing insurance? In other words, do the metrics that have been used to date to evaluate IBLI correspond to welfare gains or losses?

Our second major contribution is to **design behavioral interventions which use the knowledge gained from the elicitation of preferences and beliefs to provide tailored advice about the expected welfare effect** of IBLI insurance for individual pastoralists. The idea of the behavioral interventions is to focus on improving the insurance choice architecture in such a way that the insurance decisions are more likely to lead to an improvement in consumer welfare: more winners, and fewer losers. We use the term "behavioral interventions" to refer to different choice architectures and propose investigating:

1. How the insurance choice architecture should be "informed and framed" to enhance average welfare, as well as to increase the prevalence of welfare gains and reduce the prevalence of welfare losses, from insurance decisions.
2. If we can identify structural characteristics of potential beneficiaries (such as gender, base camp location, herd size, and subjective beliefs about the coming season) that make them more likely to be a winner in terms of welfare from insurance decisions as a result of particular choice architectures, and whether those insights could then be integrated and scaled-up into IBLI extension and marketing.

Behavioral interventions aimed at improving welfare could include informational interventions (more information, or practice), providing information about peers' decisions or outcomes, or the use of nudges through a "sales pitch" of a sales agent (Thaler and Sunstein, 2003; Ashraf et al., 2006; Bertrand et al., 2010; Karlan et al., 2016; Berg and Zia, 2017). These are all "one size fits all" interventions, applied equally across individuals.

Research in the lab has already tested the effect on take-up and consumer welfare of a range of blanket, one-size-fits-all interventions that are typically used in the field. Most of these interventions have also been studied in field settings as well:

- Informational interventions:
    - **More information:** whether more details of the product increases understanding and thereby allows people to make choices that more closely match their preferences (Cole et al. 2013, 2014; Takahashi et al. 2016; Jensen et al. 2018).
    - **Practice:** whether hypothetical experience with decisions and realizations in "games" increases understanding and thereby allows people to make choices that are closer to their preferences (Norton et al. 2014; Cole et al. 2014).

- Nudging:
    - **Information about peer decisions:** whether peers' insurance decisions functions as an endorsement, as distinct from the peer informational channel, in the adoption decision (Banerjee et al. 2013, Bursztyn et al. 2014; Cai et al. 2015).
    - **Sales pitch:** whether a frame that stresses the positive aspects of insurance, such as "peace of mind," nudges people to buy insurance.

From this lab work (Harrison and Ng, 2016, 2018, 2019 and Harrison et al. 2019) we find that when subjects make insurance decisions they typically don't realize the full potential welfare improvements that could have been achieved. Many subjects make welfare gains, but could have achieved more gains, and many subjects suffer welfare losses. For some *identifiable* sub-groups, the subjects could have doubled their welfare gains by making different decisions.

We find that designing behavioral interventions in the lab that improve welfare, or at least "do no harm," is not straightforward at all. None of the blanket, one-size-fits-all interventions creates substantial improvements in welfare across the board, even if they do for identifiable minorities, while the majority of interventions do increase take-up. But take-up, again, is not welfare: we want to avoid increasing insurance purchases of products that reduce individual welfare. Hence the importance of framing the intervention design problem around expected change in welfare rather than around maximizing insurance take-up, as has been conventional. Focusing on uptake presumes that purchasing insurance increases expected welfare for all individuals, and this is demonstrably not true in the lab.

Both field and lab results make it clear that we need better tools to identify winners and losers from IBLI purchases, measured in terms of welfare effects. They also highlight the need for behavioral interventions that tailor insurance extension and marketing so as to improve welfare across the board, reduce households' inefficiency in seizing the gains to be had from well-designed index insurance policies, and reduce the frequency with which index insurance sales inadvertently do harm.

It is relatively straightforward to "connect the dots" of these ideas when it comes to the **descriptive evaluation** of IBLI interventions. We just conduct the usual randomized evaluations of treatments, but augment them with incentivized tasks to elicit the preferences and beliefs of pastoralists. We can then evaluate the causal effect of the observable intervention on the latent estimate of the welfare change for those presented with the intervention, whether or not they purchase the product. Critically, this causal chain is mediated by latent estimates of risk preferences and beliefs. This is not your usual randomized evaluation, but an "augmented randomized evaluation" that allows us to draw structural insights into the heterogeneity of welfare impacts.

There are actually several ways to "connect the dots" of these ideas when it comes to the **normative evaluation** of these IBLI interventions.

One way would to connect the dots be to use the individual estimates of preferences and beliefs to tailor an intervention for each subject. For example, the design of welfare-enhancing products for individuals that have Expected Utility Theory (EUT) risk preferences, all else equal,

is much easier than it is for those that have Rank-Dependent Utility (RDU) risk preferences: just make sure that their risk aversion is not too high (Clarke, 2016). For RDU individuals, there is much more to worry about: even increases in the correlation between the index and idiosyncratic risk, which is always an improvement under EUT, can lead to welfare losses (Harrison et al. 2019).

For practical reasons, to do with inferential power and critically the scalability of insights from our project, we instead "connect the dots" normatively by identifying sub-groups of pastoralists that are statistically likely to respond to specific interventions. We define sub-groups in terms of observable characteristics, such as those noted earlier, as well as latent characteristics such as preferences and beliefs. We then use statistical methods, such as quartile regression, or even machine-learning algorithms to generate "random forests," to link sub-group X with treatment Y (Carter et al. 2019). We then test these predictions to see if they do lead to improved distributions of welfare.

The recognition that heterogeneity of welfare impact might be the basis for normatively designing better, conditional interventions is one that has tremendous promise in general, illustrated by Carter et al., 2019. Rather than just providing one-size-fits-all interventions, these behavioral interventions are tailored to provide specific advice or information designed for the behavioral characteristics of those making insurance decisions. These are "behaviorally smart" conditional interventions, not unconditional "nudges" in the spirit of Thaler and Sunstein (2003).

We will observe actual IBLI insurance decisions in the seasons following the behavioral interventions, which allows us to speak about *realized* gains and losses in consumer welfare in a field setting. The demand for insurance products, of course, should be driven by *ex ante* welfare effects of purchase, but an important policy question is whether this is overcome by realized welfare from one or two historical observations. This comparison requires that we allow for the effects of realized events on preferences and beliefs, so we know if any attrition over time is generated for the normatively right reasons (new information changes state-dependent preferences and leads to updated beliefs) or the normatively wrong reasons (the insurance product is viewed as an investment vehicle rather than a risk-management tool).

Ideally, we will find behavioral interventions that generate large *ex ante* welfare gains for some, and no significant welfare losses for others. Or we can find sub-populations that always seem to lose in welfare terms from insurance purchase options and target them with behaviorally smart conditional interventions.

Research Design and Workplan

The project design will utilize the infrastructure of an existing IBLI product that is sold by the Oromia Insurance Company (OIC) in the Borana Zone of Ethiopia, and that our team has extensive experience with over many years. As background, the OIC sales and distribution structure is as follows. Each kebele that has active IBLI sales has at least one village insurance promotor (VIP) and one partner cooperative. In some of the larger kebeles, there are multiple VIPs and cooperatives, but the model is always one VIP for each cooperative. The VIP acts as

the primary information channel between OIC and the cooperative, providing training to cooperative members and supporting the cooperatives during its own IBLI outreach activities. The cooperatives handle all premium collection and client registration. The 14% commission on sales is split between the VIP (8%) and the cooperative (6%).

There are about 80 kebeles in the Borana Zone that have an active IBLI sales structure. Each of these kebeles has 3 zones for a total of 240 total zones. Utilizing the current insurance promotion architecture, we will randomly assign 1,920 herders in 240 zones, the lowest sub-administrative unit, to receive one of three field interventions. The first intervention is a pure control, based on the current *status quo*. The three interventions are:

1. Sales agents, at the zone level, provide **basic information** about the product and face their **usual incentives** for selling the product (control, the status quo).
2. In addition to the status quo intervention #1, sales agents provide **tailored advice** to herders based on their elicited preferences and beliefs. This advice will be provided in a way to convey this information: "*Please recall the paid choices you recently participated in with XXX. Your choices helped us learn about how you think about risk and time in your decisions. Based on those choices, and our evaluation of them, we recommend that the best decision for you to make today is to purchase insurance for X Total Livestock Units (TLU's)*" Of course, for some herders we will recommend X = 0.
3. Sales agents provide tailored advice to herders as in treatment #2, and in addition are financially **incentivized to maximize welfare gains, as determined by our recommendations,** rather than simply maximize sales. This treatment asks if changing the incentives of sales agents to be aligned with the objective of maximizing welfare rather than maximizing sales is a prerequisite to achieve enhanced welfare, rather than just informing herders. Hence we will reward sales agents by how close to the recommendation the observed purchase is. This treatment recognizes that there are "intangible" ways that sales agents can influence decisions, and whether it is important to financially align them with our normative metric.

To increase the comparability of the interventions we aim to make each of the interventions budget-neutral, and similar in as many ways as possible. To ensure that agents in the control have "face time" with the control group and that the two treatments have equivalent budgets, we will provide the VIPs in this control with the same types of infrastructural and transportation support we provide the agents in the other treatment arms.

To design the tailored interventions, the data collection needs to occur in several stages to exploit insurance purchase information from OIC's two active IBLI selling seasons in the Borana Zone: January-February 2020 and August-September 2020.

September - December 2019: Pilot, Baseline Survey, and Artefactual Field Experiments

Participants will participate in artefactual field experiments and a short baseline survey. In the artefactual field experiments their atemporal risk preferences, time preferences, intertemporal risk preferences, and subjective beliefs about loss probabilities and contractual performance will be elicited. Subsequently they will participate in an experiment where they will make a number of

insurance decisions in which relevant insurance parameters will be varied. These artefactual field experiments have already been piloted by the team (Cornell, CEAR, ILRI, Utrecht University) with pastoralists in Borana in May 2019. They were adapted for local application from the theoretical framework and experimental designs of Andersen, Harrison, Lau and Rutström (2008)(2014)(2018), Harrison, Martínez-Correa and Swarthout (2015) and Harrison, Martínez-Correa, Swarthout and Ulm (2017).

The CS for insurance decisions in artefactual index insurance experiments, designed to simulate actual insurance decisions for the sake of the pilot, are currently being analyzed. Before the pastoralists participate in the artefactual insurance experiment, each of the 240 zones will be randomly assigned to a control or treatment arm where the information they will receive about the artefactual insurance product will vary:

1. Basic information about the insurance decisions and parameters in the experiment.
2. Actuarially equivalent information about the experiment that prevent subjects from violating the Reduction of Compound Lotteries (ROCL) axiom that is central to their behavior towards the basis risk inherent in index insurance.
3. Information about the decision of peers for each insurance decision.
4. A nudging intervention with an insurance sales pitch.

The basic information treatment should be designed based on the status quo information herders currently receive in the marketing of the IBLI product. For the short survey, data will be collected about household and pastoralist characteristics.

The Ethiopian Environment and Climate Research Centre (ECRC) will be responsible for the data collection with 1920 herders in 240 zones at baseline and endline. From September-October 2019 we will hire a full-time research manager who will be responsible for managing the research, programming, data management, and supervision. ILRI will be responsible for providing lists of 8 herders in each of the 240 zones for the 1,920 herders who will be interviewed at baseline and endline. ILRI will also be responsible for organizing herders to be present at a central location in each zone on the day of the interview and will coordinate this with the ECRC research manager. The interaction between the staff at ECRC and ILRI, along with direction from the investigators on the project, will ensure local capacity building and continuity of collaboration.

January - February 2020: IBLI insurance sales window

The Oromia Insurance Company (OIC) will sell insurance in the region as usual. After the sales window has closed, ILRI will collect the administrative data on IBLI purchases from the region and match it to the baseline survey participants. ILRI has collaborated closely with OIC for over 10 years related to IBLI's development and subsequent sales. ILRI currently has informal access to much of OICs sales data, but this access would need to be formalized and protocols developed for its use for this project. We are confident that OIC would be open to such a collaboration, and this will be the responsibility of the ILRI project manager.

January - June 2020: Develop Participant-Specific Models of CS and Assess Insurance Decisions

The first step of the analysis will calculate the expected CS gained and foregone from the artefactual field experiment conducted in November–December 2019 and from the IBLI insurance decisions in the January-February 2020 sales window. The second step of the analysis will assess the impact of the behavioral interventions on the expected CS gained and foregone from both types of insurance decisions. This will allow us to answer the following questions:

- Who are winners and losers from these insurance decisions, the decisions in the artefactual field experiment and the decisions in the natural field IBLI experiment?
- Can we identify structural characteristics of winners and losers from insurance decisions in the artefactual field and natural IBLI experiments?
- To what extent do behavioral interventions increase or reduce the CS from insurance decisions in the artefactual field experiments?
- Can we identify structural characteristics of pastoralists who gain or lose relatively more from behavioral interventions in the artefactual field experiments?

May - August 2020: Design and Implement the Field Interventions

We will first calculate and design tailored insurance advice for the IBLI product for each of the sub-groups of the 1,920 pastoralists in the study, based on the preferences and beliefs elicited through the artefactual experiments in November-December 2019. The actual treatment modes will be standardized, and will include multimedia materials to ensure that the correct information is delivered in a uniform manner.

The VIPs of OIC will be trained on how to implement the interventions by ILRI, and ILRI will supervise the implementation. Again, the VIPs will provide an informational treatment to participants in both the treatment and control zones. In the case of the control, the VIPs will deliver a general informational message on IBLI. In the case of the treatment, the VIPs will deliver the same general informational message followed by the tailored insurance advice.

August - September 2020: IBLI Insurance Sales Window

OIC will sell insurance in the region as usual. After the sales window has closed, ILRI will collect administrative data on IBLI purchases from the region and match it to the survey participants.

September - October 2020: Endline survey

ECRC will collect an endline survey of the 1,920 project participants. This survey will include sets of questions aimed at learning about understanding of IBLI, reasons for their purchase decision, and consistency of beliefs and preferences with those collected during the original artefactual experiments.

October – December 2020: Draft Findings

Once the endline survey and OIC administrative data have been collected, the project team will calculate the CS from the second selling season of the IBLI purchase decisions to identify

impacts of the field interventions. The finding of the research will be drafted, with special attention towards evidence-based policy implications. The research report will also include discussion as to how these methods could be modified to be easier for insurance companies in general to apply them without all of the structure we need for our purposes. The intention is to use our experience to discuss how the "application of concept" might be implemented in a quicker, cheaper manner than is necessary for our "proof of concept."

Timeline

Task	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20
Design experiments	■	■														
Pilot		■	■													
Baseline survey and artefactual field experiments			■	■												
IBLI insurance sales window 1. Data collected about insurance purchase decision					■	■										
Data analysis on CS gain/loss from artefactual field experiment and sales window 1						■	■	■	■							
Design and implement the field interventions based on findings from data analysis									■	■	■	■				
IBLI insurance sales window 2. Data collected about insurance purchase decision by each treatment arm												■	■			
Endline survey													■	■		
Draft of findings														■	■	■

Collaborating Institutions

International Livestock Research Institute (ILRI); Ethiopian Environment and Climate Research Centre (ECRC); Cornell University; Center for the Economic Analysis of Risk (CEAR) at Georgia State University; and Utrecht University.

Budget

There are 240 zones and we will randomly sample 8 herders per zone, thus 1,920 herders in total will participate in the baseline survey with artefactual field experiments, the intervention, and the endline survey. Since one of the main forms of IBLI promotion is via the VIP during regular village meetings near the selling window, we will leverage these general meetings to identify and then randomly sample the herders. With 8 herders sampled per zone, ECRC is able to conduct 1 session per day per zone. One enumerator can cover 2 herders, so for 1 zone we need a team of 4 enumerators and 1 supervisor at the village meetings to conduct the baseline survey and experiments. Assuming that 1 team can cover 40 zones in the periods of the baseline

and endline surveys, we need 6 teams working simultaneously with the local VIP at the village meetings.

Six teams and 8 herders per team implies that we require 48 laptops to be deployed in the field with the ECRC enumerators during the periods of the baseline and endline surveys. Since the Borana Zone is remote, there are increased costs with respect to transportation as well as communication with the local villages and VIP. Prior to deployment in the field, the ECRC enumerators and supervisors will be trained and all field protocols piloted with oversight by a principal investigator.

The intervention will be administered at the zone level and the tailored advice would be provided by the VIP, with direct oversight from ILRI using standardized procedures.

There is also budget allotted to the project investigators to travel to Ethiopia to collaborate with the local partners and provide training as required.

GSU would administer the award with sub-awards going to ECRC and ILRI to carry out the project. This project is subject to GSU's Federally negotiated F&A off-campus rate, which is 26% on modified total direct costs, applied only to the first $25,000 for each sub-award. The total project budget and total budget requested is $355,164.

Budget Proposal:	BASIS Markets, Risk and Resilience Innovation Lab		
Project Name:	Do No Harm: Evaluating the Welfare Effects of Behavioral Insurance Interventions in Ethiopia		
Budget line	**Detail**	**Cost (USD)**	**Institution**
1. Laptops	48 laptops @ 500 USD + 10% maintenance	$ 26,400	GSU
2. Pilot and training	Pilot survey and artefactual field experiments; train enumerators and supervisors	$ 10,000	ECRC
3. Baseline data collection	1920 herders @ 50 USD per survey (Remote areas of Borana, Ethiopia)	$ 96,000	ECRC
4. Baseline experimental incentives	1920 herders @ 8 USD per participant	$ 15,360	ECRC
5. Endline data collection	1920 herders @ 30 USD per survey	$ 57,600	ECRC
6. Endline experimental incentives	1920 herders @ 8 USD per participant	$ 15,360	ECRC
7. Intervention / VIP training	1920 herders @ 29 USD per intervention	$ 55,680	ILRI
8. Staff time ECRC	Research Manager for 12 months (full time)	$ 20,000	ECRC
9. Staff time ILRI	Project Manager and Research Associate for 12 months (partial time)	$ 20,000	ILRI
10. International travel	Travel for research team staff	$ 15,000	GSU
Total Direct Cost		$ 331,400	
GSU Modified Total Direct Cost	Note: only the first $25,000 of each sub-award is charged F&A rates		$ 91,400
F&A Off Campus Rate at 26%	Charged on the MTDC	$ 23,764	
TOTAL PROJECT		**$ 355,164**	

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