Reformulating Index Insurance to Protect Women's Assets and Well-being: Evidence from Pastoralist Communities in Kenya

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Abstract

The novel insurance contracts for crop losses and livestock mortality that have been developed in low income countries typically protect against shocks in the male sphere of economic activity. Often overlooked are women, the particularities of their indirect exposure to this risk, and their socially constructed responsibility to manage family well-being. To fill this lacuna, this paper studies the effect of a low-cost intervention that reformulates a livestock insurance contract so that it directly addresses women's risk and is sold in units that are commensurate with women's expenditure responsibilities. We measure the effect of this contractual reformulation using a randomized trial amongst pastoralist communities in Kenya. Twenty-four percent of previously subsidized households that received the novel contractual formulation purchased insurance (without subsidy), compared to only 13% of previously subsidized households offered insurance under the standard male-risk formulation. Households that had not received prior insurance subsidies purchased no insurance, irrespective of the framing. Protecting women, their assets and those who depend on them will require a combination of smart subsidies and gender-intentional insurance contract design.

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1 Introduction

A growing body of research finds that poverty graduation programs targeting 'ultra-poor' women with significant asset transfers positively affect women's wealth, consumption, food security, physical and mental health (Banerjee et al., 2015; Bandiera et al., 2017; Bedoya et al., 2019; Banerjee et al., 2021). However, because poverty graduation programs are centered around asset transfers, negative shocks that lead to asset losses threaten to diminish or eliminate these impacts.[1] With the goal of protecting women's assets built up through graduation programs, this paper explores how to reformulate implementable index insurance so that it addresses the particularities of women's risk exposure and their spheres of expenditure responsibility within the household.

The BOMA Rural Entrepreneur Access Program (REAP) builds up the productive assets of chronically poor women in the pastoralist regions of East Africa, and operates similarly to other graduation programs. Zheng et al. (2023b) show that like these other programs, REAP is effective in supporting pastoralist women in rising out of poverty. But women targeted by REAP live in an especially risky environment. Most households rely primarily on livestock for their livelihoods, and frequent droughts lead to significant livestock losses and cuts to household consumption. Motivated by the centrality of risk in pastoralist regions, a research group collaborating with private insurers introduced index-based livestock insurance in Northern Kenya in 2010.[2] In the study area for this paper, the product is structured as a Sharia Law-compliant takaful[3], and hereafter we refer to this contract as Index Based Livestock Takaful, or IBLT. Since its inception (Chantarat et al., 2013) this insurance was

[1] In one of the cases studied by Banerjee et al. (2015) (Honduras) exactly this happened. Positive results estimated at the first endline were eliminated by a shock that destroyed the assets built up program beneficiaries. By the second endline and the earlier estimated increases in consumption had vanished.

[2] Index insurance makes payments based on an index that determines payments to everyone in a predefined insurance zone (e.g., a county). Index based livestock insurance in Kenya relies on a remotely sensed index of vegetative growth in the open rangelands. Because it eliminates the need to measure and verify individual losses, index insurance can in principal be offered to low wealth households in remote location without concerns regarding adverse selection and moral hazard.

[3] A takaful is a Sharia Law compliant form of insurance that contains certain provision for risk- and profit-sharing between the insurance company and the client.

sold on a per-animal basis, thus targeting assets in the culturally-determined male domain of economic activity.

While women typically do not manage livestock herds that roam the open rangelands covered directly by IBLT, both they and their businesses are exposed to rangeland drought risk. Because livestock are the primary assets and income sources for the majority of households, droughts that destroy livestock also dramatically diminish demand for other goods and services. Droughts can also affect women's businesses indirectly when their partners reduce their contributions to household public goods, creating pressure for women to sell their assets to cover household expenses that are ultimately seen to be women's immediate responsibility.[4] Further, despite the potential for index insurance to significantly reduce the negative impacts of drought on women and men, index insurance uptake in this and many other settings has been low (Carter et al., 2017).

This paper studies the effect of introducing of a low-cost intervention to make index-based insurance fully available for both women and men and thereby boost insurance uptake and its potential impacts. To make index insurance available for women, we modified the existing index-based livestock insurance in two ways. First, in marketing and educational materials, we reframed the insurance around women's indirect exposure to rangeland drought by calling out women's risk of reduced income in their own businesses, as well as the risk of reduced intra-household resource transfers from their spouses. Second, we changed the units in which insurance is sold from the number of livestock that need protecting to number of household members whose basic needs are at risk. We label this two-pronged reformulation of IBLT as gender-inclusive (GI) insurance.

In order to gauge the impact of the novel GI insurance product, we implemented a randomized controlled trial across 87 communities. In a randomly selected set of 43 con-

[4]This possibility is examined theoretically in Hobbs (2022) which studies an intrahousehold model similar to Browning et al. (2010). Lundberg and Pollak (1993) and Carter and Katz (1997) develop separate spheres models which closely match this paper's perspective on expenditure responsibilities and intrahousehold transfers.

trol communities, BOMA Mentors[5] provided marketing and educational information about traditional index-based livestock insurance. In the 44 treatment communities, mentors presented the GI insurance product, emphasizing women's risk exposure, assets and expenditure responsibilities. Conventional IBLT, denominated in animal units, remained available for purchase in treated communities.

As part of the broader impact evaluation of the BOMA REAP program, discount coupons for IBLT insurance were randomly distributed to half the women in the study. Coupons were valid from 2018 to 2021. Our analysis here focuses on the 2022 sales season, after the expiration of the coupons. We thus have a 2x2 experimental design, with some women previously offered subsidies and others not, and some offered the GI framing and others not. Our key finding is that there are significant positive synergies between the coupon and the GI treatments. Without prior subsidies and the opportunity for inexpensive experimentation with index insurance, the GI treatment was ineffective at increasing demand from its zero level observed for households who had not received neither the subsidy nor the GI treatment. However, 13% of the subjects who received only the subsidy treatment purchased the insurance in the post-subsidy season, whereas a significantly larger 24% of subjects who received both treatments purchased insurance, signalling the presence of substantial complementarities between the subsidy and GI treatments. These results imply that protecting women, their assets and those who depend on them will ultimately require a novel combination of smart subsidies and a gender-inclusive insurance design.

The next section provides background on index-based livestock insurance and the development of family insurance. Section 3 explains in greater detail our experimental design, and Section 4 discusses the results our our empirical work. Section 5 concludes.

[5]As part of the BOMA REAP program, mentors meet regularly with women to teach skills and support their nascent businesses. For this experiment, mentors held meetings open to all members of the community.

2 Gender Inclusive Index-based Livestock Insurance

Index insurance is a form of agricultural insurance that uses an index related to production (*e.g.*, satellite vegetation indices, rainfall, or temperature) to identify adverse conditions and compensates policyholders when that index for their geographic area falls below a predetermined threshold. Index insurance has several major advantages compared to traditional indemnity-based insurance. First, there are no individual claims to verify, significantly reducing costs for the insurer. Second, moral hazard is eliminated, since policyholder actions cannot affect their probability of receiving a payout. Third, adverse selection is eliminated since the insurer can observe historical data for the index and price the contract accordingly for each insurance area. The major disadvantage is that the index may fail to reliably capture losses that individuals face (Benami and Carter, 2021) and that uptake is very modest, due in part perhaps to this problem of contract reliability Carter et al., 2017.

This following subsections detail the existing IBLT product and the modifications made to create the new gender inclusive insurance product that is the subject of this study.

2.1 Index-Based Livestock Insurance

As discussed in the introduction, index-based livestock insurance program was introduced in Northern Kenya in 2010. The index that determines payouts is based on satellite-derived estimates of forage availability, and the contract pricing and payouts are determined at the level of relatively small geographic areas. Payouts are calibrated to allow livestock herders to purchase fodder for their animals in times of drought when natural grasses are scarce (Jensen et al., 2019). As originally designed, the product is intended for nomadic pastoralists, who are mobile and spend months each year traveling in search of forage during dry seasons. Livestock ownership and herding is traditionally a male activity — men typically travel with their herds while women are typically sedentary, staying at a home base, with dependent family members and pursuing activities in the local economy.

In Northern Kenya, there are two rainy seasons each year. The short rainy period spans from October to December, and the long rainy period spans from March to May. There are two insurance sales windows that occur between the rainy seasons, one in January/ February and the other in August/ September. Insurance purchased during a sales window covers the next two rainy seasons (or one year), and generally pastoralists who buy insurance during one window will not buy during the subsequent window since their prior insurance purchase is still providing coverage. Under the conventional framing, pastoralists are encouraged to think of the number of animals they need to protect and to purchase coverage for the appropriate number of goats, sheep, camels, and cows at risk. The total premium and payouts are calibrated to support the number of animals they insure.

2.2 Lab-in-the-Field Experimental Pre-test of Gender-inclusive Livestock Insurance

As a prelude to the real world experiment described in the next section, Hobbs (2022) used a lab-in-the-field experimental game to test the impact of reformulating index-based livestock insurance to make it gender inclusive as described above. The lab experiment relied on a tablet-based game designed to simulate pastoralist life[6]. In the game, participants are asked to allocate a budget between family needs, livestock, insurance, and cash savings for a number of seasons and experience weather shocks each time. In the experiment, participants played several rounds of the game before playing a final incentivized round from which data was collected. Just as in this study, in half of the sessions the insurance used the gender inclusive framing, while in the other half it was framed around livestock. Compared to the conventional framing, the GI treatment increased the share of total spending allocated to insurance by 27% for women and about 17% for men, though the difference from the conventional framing was not statistically significant for men.

The results from Hobbs (2022) indicate that changing the way insurance is formulated

[6]See https://vimeo.com/293182472 for a demonstration of the game.

may affect purchase decisions, especially for women. The result were also sufficient to encourage our commercial insurance partner to experiment with GI insurance. But the more important question is whether this reformulation of IBLT demand in the real world, opening the door to protecting women's well-being and the assets they build up independently or through graduation programs.[7]

2.3 Gender-inclusive Insurance Design

A body of research shows that in many settings, negative shocks disproportionately affect women. In a sample of rural Zimbabwean households, droughts reduced the body mass index of women and daughters but not men and sons (Hoddinott and Kinsey, 2000). Typhoons in the Philippines increased child mortality for female infants, but not males (Anttila-Hughes and Hsiang, 2013). Dercon and Krishnan (2000) find that women who fell ill in rural Ethiopia received a smaller share of household nutrition, but no such effect was seen for men. Most pertinent to this study, Quisumbing et al. (2018) show that droughts in Uganda reduced women's assets, but not men's. Similar to many places, the pastoralist communities in northern Kenya have tightly defined gender roles and responsibilities. This study's maintained hypothesis is that when coupled with women's socially-defined responsibility to deliver household necessities like food, medicine, and school fees, rangeland drought puts women's newly constructed asset base at risk, not to mention their own personal consumption.

To address women's risk exposure, two changes were made to the conventional IBLT product to make it more likely to resonate with women. Appendix Figures A1 and A2 display panels from comic books was used to present IBLT under the GI and standard framings, respectively. Both comics depict a conversation between two women discussing how a recent drought had impacted them. Under the GI framing, one woman remarks "You know that when rangeland and forage is bad, we suffer at home ... few meals, no money for

[7] A number of studies have deployed lab in the field experiments to educate people and test demand for index insurance (Lybbert et al., 2010; Elabed and Carter, 2015; Serfilippi et al., 2018). Such experimental games have typically massively overestimated real insurance demand, a fact on which McIntosh et al. (2020) ruefully remark.

school fees, no money for anything." In contrast, under the standard framing the women in the comic emphasize the usefulness of the insurance to protect (men's) livestock.

The second change made to IBLT to increase its salience to women was to shift the unit of purchase from "tropical livestock units"[8] to "family units." This new unit of purchase was offered to allow women to calibrate how much insurance they might need given the number of family members they need to protect given their expenditure responsibilities (as opposed to the number of goats, camels and cows that their husbands need to protect). The payouts for each family unit were set to approximately equal the per-capita amount of emergency aid that the Government of Kenya offers under its social protection program called the Hunger Safety Net Program (HSNP). Specifically, a single 'family unit' of insurance cost 1,056 Kenyan Shillings (8.5 USD at the time of this study) and paid a maximum of 5,600 Kenyan Shillings (about 45 USD) in the event of a drought. By comparison, coverage for a single sheep 264 Kenyan Shillings with a maximum payout of 1400 Shillings. Insurance agents were trained to sell IBLT in either TLU or family units of coverage.

3 Experimental Design

To study the impact of reformulated gender-inclusive IBLT, we were able to take advantage of a large-scale, on-going RCT intended to gauge the impact of the BOMA REAP graduation program alone and in combination with livestock insurance. The study spanned the 2018 to 2022 period. As described in Zheng et al. (2023b) women eligible for the graduation program were randomly assigned to treatment waves. Because there were more eligible women than spaces in the graduation program[9], some eligible women never received the program. The BOMA REAP program provides women with grants, training, and ongoing mentor support to start businesses. It is similar to the poverty graduation programs evaluated in Bandiera

[8]Tropical livestock units (TLU) converts different species of animals into bovine-equivalent units. A camel is worth 1.4 TLUs, whereas a sheep is 0.1 TLUs.

[9]The implementing NGO did not want to over-saturate the remote communities with too many businesses because of negative pecuniary externalities.

et al. (2019), Banerjee et al. (2021), and Banerjee et al. (2022). One of the features of this program is regular visits from mentors who provide coaching and support to women involved in the program.

A separate individual-level randomization gave insurance discount coupons to 50% of women in the study, including treated and untreated graduation program-eligible women, as well as a smaller sample of women who were marginally too well-off to be eligible for the BOMA REAP program. The notion behind the coupons was that they would be "smart subsidies" that would enable low cost experimentation and learning about insurance that would carry over in the form of sustained insurance demand after the coupons expired. Coupons were valid from 2018 to 2021 and allowed families to obtain insurance at zero to low cost. For the first 3.5 years, IBLT was solely marketed using the standard, livestock-centric framing. In the second half of 2021, after our commercial partners bought into the idea, the GI framing was introduced in approximately half of the 87 communities (locally called manyattas), selected at random, from the graduation program study.[10]

In manyattas selected to receive the GI insurance treatment, mentors in August 2021 gave an oral presentation in the local language (Samburu) on the insurance product accompanied by the comic book described earlier. The comic and presentation also covered technical aspects of how the insurance worked, pricing, payment modalities, etc. Hard copies of the comics in Swahili were left in each community. Swahili was chosen for the hardcopies as most people who can read are able to read Swahili, whereas few people actually read Samburu. An audio file containing a Samburu language reading of the comic was also made available using a popular file sharing platform, although we have no information on the use of that platform. In the Feburary 2022 insurance sales season, mentors revisited communities and reinforced the messages delivered on insurance. Importantly, this 2022 sales period took place after all insurance discount coupons had expired. It is also important to note that in these treatment villages mentors made clear that insurance could also be purchased in livestock units in the

[10] Assignement to GI treatment or control was stratified by mentor to insure that all mentors had roughly the same number of treatment and control communities.

usual way.

In control communities for the GI insurance formulation, mentors held similar community meetings, except that the insurance was described exclusively in the traditional livestock-focused way, with livestock as the only units insured. The livestock comic books were distributed to the community, and all other procedures mimicked those in treatment communities.

Because this study was attached to a large randomized controlled trial, we have detailed survey data on treatment and control households from 2018 when the baseline survey was conducted. Table A1 in the Appendix shows sample means from our treatment and control households for a variety of measures, and for most there is no statistically significant difference between the two groups. We do see a few exceptions to that: the households that received the 'family' framing were more likely to have at least two sources of income and had lower average dietary diversity scores. The 'Wave' measures correspond to when households were enrolled in the REAP treatment, with households in Wave 1 enrolled immediately after the 2018 baseline survey and each subsequent wave enrolled at 6-month intervals. A slightly larger share of the households enrolled in waves 2 and 3 received the GI framing, but the majority of households were never enrolled in the REAP program at all. Importantly, the insurance coupons distributed earlier were randomized to test their impact with and without REAP, so many coupon recipients did not participate in REAP and vice versa.

Administrative data from the insurance companies allows us to identify which households purchased insurance for the two seasons preceding the experimental introduction of GI IBLT and two seasons after it. Insurance transactions take place using mobile money transfers and it is not possible to identify which person (man or woman) purchased the insurance. While we utilize data from all four sales seasons, we will primarily focus on the final season of February 2022, which took place after subsidy coupons had expired. We focus on this season in part because the February sales windows consistently had higher sales making it easier to detect effects. As mentioned, insurance cover a full 12 months, and the higher participation in the

February sales window undoubtedly reflects the fact that first sales period that occurred was in February of 2018.

To measure the effect of receiving the gender inclusive framing on insurance uptake rates we first estimate, for individual i with mentor j in manyatta k, we estimate the model

$$y_{ijk}^{22} = \beta_0 + \beta_1 G_k + \beta_2 S_i + \beta_3 (G_k \times S_{ijk}) + \alpha' \mathbf{W}_{ijk} + \gamma_j + \varepsilon_{ijk}. \quad (1)$$

where outcome y_{ijk}^{22} is either a dummy variable indicating if the individual bought insurance during the first season of 2022 or the amount (in Kenyan Shillings) paid by the individual to purchase insurance that year. The variable G_k indicates if the family framing was presented in manyatta k, and variable S_{ijjk} indicates if the individual had in the past received any subsidy coupon. The vector $\mathbf{W}_{ijk}$ represents a set of indicator variables that take the value of 1 if the individual was assigned to receive the BOMA REAP treatment in any of the first 5 treatment waves. Variable γ_j represents mentor fixed effects. Because mentors generally operate in contiguous geographic regions, that fixed effect can also be thought of as controlling for regional characteristics. Standard errors in all regressions are clustered at the manyatta level. The identifying assumption in equation 1 is that treatment status is uncorrelated to the error term, which should be ensured by treatment randomization.

4 Results

Results from estimating equation 1 for the binary decision whether to buy insurance are shown in Table 1. We display results for both linear probability and probit models, with columns 1 and 2 dropping the interaction term between the GI and subsidy treatments. For this first specification (which rules out complementarities), we see that the GI treatment increased the probability of buying insurance by about 4.6 percentage points. As can be seen, irrespective of the GI treatment, receipt of subsidy coupons in prior seasons has a substantial impact on the decisions to purchase IBLT insurance (as discussed earlier, the

coupons were no longer valid for purchases in the 2022 season).[11].

Table 1: Probability of buying insurance - Sales window of season February 2022

	(1) OLS	(2) Probit Marginal Effects	(3) OLS	(4) Probit Marginal Effects
Gender Inclusive (GI)	0.0406*	0.0411*	-0.0055	-0.0038
	(0.0218)	(0.0211)	(0.0099)	(0.0115)
Had any coupon	0.2382***	0.7608***	0.1933***	0.7514***
	(0.0243)	(0.0476)	(0.0295)	(0.0493)
GI * Any Coupon			0.0957*	0.0448*
			(0.0482)	(0.0243)
Constant	-0.0754**		-0.0551*	
	(0.0291)		(0.0281)	
Observations	1710	1710	1710	1710
Mentor FE	Yes	Yes	Yes	Yes
Additional Controls	Yes	Yes	Yes	Yes
$\hat{\beta}_1 + \hat{\beta}_3$			.0902*	.0411*
			(.0457)	(.021)

Notes: Standard errors clustered at the manyatta level in parentheses. Regressions with additional controls include the BOMA project participation wave. *** p<0.01, ** p<0.05, * p<0.10.

Columns 3 and 4 bring back the interaction between the subsidy and GI treatments. For those who who received coupons, the GI insurance formulation increased the probability of insurance purchase form about 14% to about 24%, while it had no statistically significant effect on those who did not receive coupons. Figures 1 displays these estimates in bar graph form, while 2 display the difference between the standard and GI insurance formulations (that is, the figure plots the sum of coefficients ($\hat{\beta}_1 + \hat{\beta}_3$) in equation 1).

To ensure that our results are not driven by pre-existing differential trends in insurance uptake rates across treatment groups and between subsidized and unsubsidized individuals, we conduct a placebo test by estimating the difference in the rate of insurance purchase between our treatment and control groups prior to the introduction of the GI insurance product.

[11]This relationship is studied in greater depth in Jensen et al. (2022).

Specifically, we estimate equation 1 for the sales windows that preceded the introduction of the GI framing (the second sales window of 2021 and the first sales window of 2021). Figures 1 and 2 show that there (future) assignment to the GI framing has no impact on insurance demand in these years. We also include estimates from the second season of 2021. The GI framing was introduced during that season, but overall little insurance was purchased at that time as the second sales widow of each year was a period of low sales due to the original intervention having been introduced during a first sales window. As can be seen, the point estimate of the impact of the GI treatment is positive, but it is not statistically significant.

Table 2: Amount paid for insurance - Sales window of season 2022-I

	(1)	(2)	(3)	(4)
	OLS	Tobit Marginal Effects	OLS	Tobit Marginal Effects
Gender Inclusive (GI)	232.1**	252.3**	-16.8	-24.8
	(106.2)	(120.7)	(50.0)	(76.5)
Had any coupon	1214.4***	5026.7***	971.9***	4878.8***
	(123.1)	(416.4)	(132.2)	(247.4)
GI * Any Coupon			517.0**	277.2**
			(239.8)	(139.6)
Constant	-222.2		-112.3	
	(157.4)		(146.5)	
Observations	1710	1710	1710	1710
Mentor FE	Yes	Yes	Yes	Yes
Additional Controls	Yes	Yes	Yes	Yes
$\hat{\beta}_1 + \hat{\beta}_3$			500.2**	252.3**
			(224.6)	(119.2)

Notes: Standard errors clustered at the manyatta level in parentheses. Regressions with additional controls include the BOMA project participation wave. *** p<0.01, ** p<0.05, * p<0.10.

Table 2 shows the effect of receiving the family framing on the amount paid by all clients, and mirrors the results in Table 1: columns 1-2

show the framing increased the amount spent on insurance by roughly 250 Kenyan

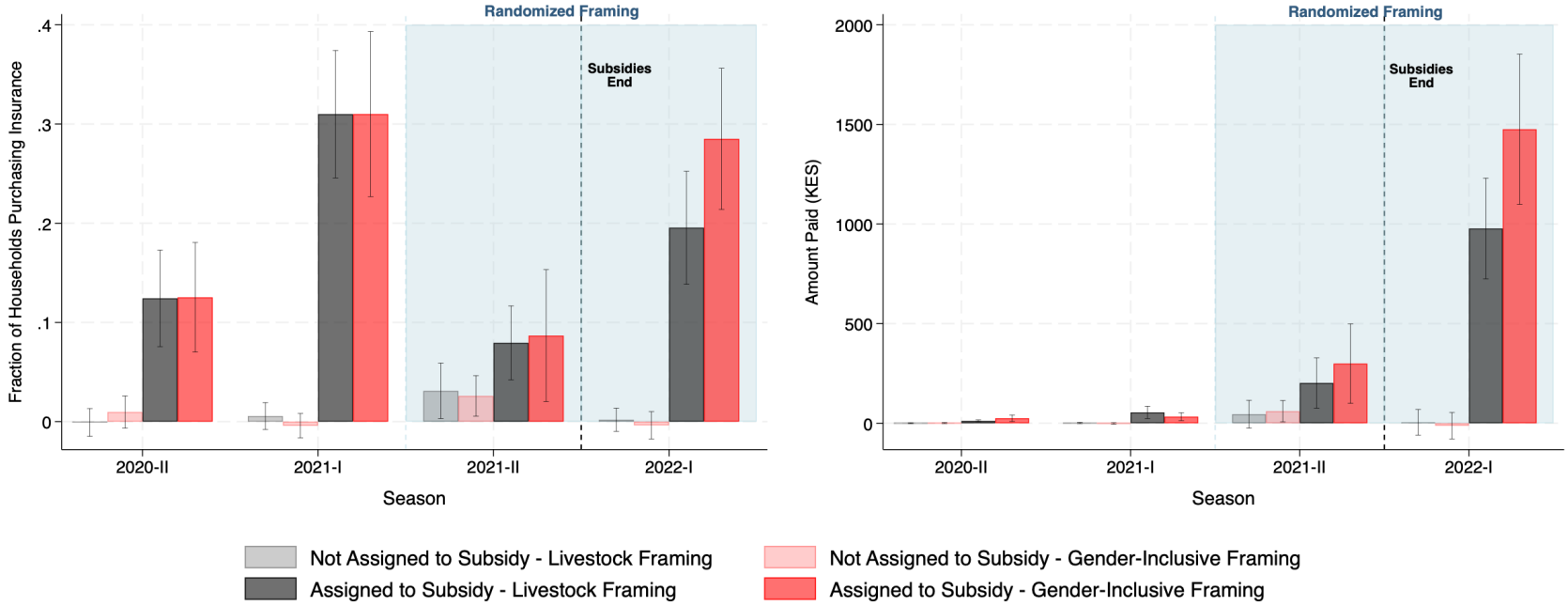
Shillings relative to a baseline of 383 Shillings, an average increase of 67%. Again, columns 1-2 show that both GI and past subsidy treatments affected the amount spent on insurance in the 2022 sales period. Columns 3-4 show that the impact on the quantity purchased is driven primarily by those who received coupons, that is, there is a large complementarity between the two treatments. Taken together these results show the intervention caused a large increase in insurance uptake, and show that the households adopting the technology are willing to pay full price for the insurance product even after the subsidy scheme elapses.

For the Tobit estimation (coloumns 2 and 4), we focus on the marginal effect of the treatment on both censored and uncensored households (that is, Table 2 presents the quantity $\frac{\partial E[y]}{\partial F_k} = P(y > 0)\frac{\partial E[y|y>0]}{\partial F_k} + E[y|y > 0]\frac{\partial P(y>0)}{\partial F_k}$). In addition to this extensive margin estimate, we can also explore how the treatment affected the intensive-margin response of only those households buying insurance (i.e. $\frac{\partial E[y|y>0]}{\partial F_k}$). We present these results in Table A2 in the Appendix, where we find some evidence of the intervention having a positive effect on the amount of insurance purchased even when only comparing households who bought a positive amount of insurance. However, these results might be confounded if households that are nudged by the intervention from non-adoption towards buying positive amounts of insurance are systematically different (e.g. poorer) than those households who would have purchased the product regardless.

5 Conclusion

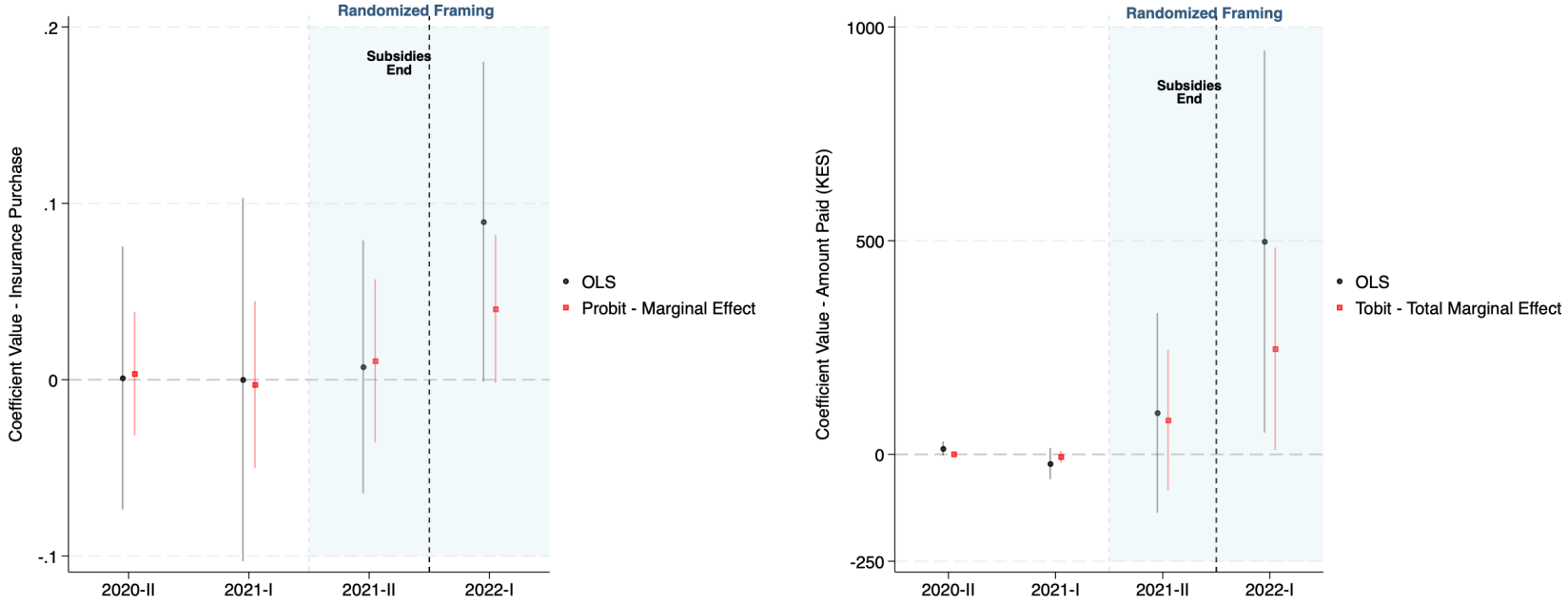
Index-based insurance is intended to protect low-income rural families from financial hardship when crops or livestock experience negative shocks. Understandably, index insurance is generally framed around the income and assets that are directly at risk. In the case of index-based livestock insurance, this framing has meant focusing on livestock, which are generally owned and managed by men. As a result, the benefits of insurance for women have not been obvious, despite the fact that women's assets and consumption are indirectly exposed

Figure 1: Insurance Uptake by Season, Subsidy Status, and Framing Treatment



Notes: Left Panel: Fraction of households who purchase insurance each season by subsidy status and framing treatment. Right Panel: Amount paid by each household net of subsidies. For each season, the graph plots the sum of the following OLS regression coefficients obtained from estimating equation 1: *(i)* Non-subsidized households with Livestock Framing (light gray): $\hat{\beta}_0$, *(ii)* non-subsidized households with Gender-Inclusive Framing (light red): $\hat{\beta}_0 + \hat{\beta}_1$, *(iii)* subsidized households with Livestock Framing (dark gray): $\hat{\beta}_0 + \hat{\beta}_2$, *(iv)* Subsidized households with Gender-Inclusive framing (dark red): $\hat{\beta}_0 + \hat{\beta}_1 + \hat{\beta}_2 + \hat{\beta}_3$. The height of all bars include the weighted average of all mentor fixed-effect dummy coefficients, with weights given by the fraction of the total sample each mentor was assigned to. Error bars show the 95% confidence interval of a test on the sum of coefficients in each group being statistically different from zero.

Figure 2: Differences in Insurance Uptake by Season and Framing Treatment among Subsidized Households.



Notes: For each season the figure plots the result of a t-test with the null $\hat{\beta}_1 + \hat{\beta}_3 = 0$ after estimating equation 1 for each separate season. Left Panel: Difference between Subsidized Gender-Inclusive Framing households and Subsidized Livestock Framing households in insurance purchase rates. Right Panel: Difference between Subsidized Gender-Inclusive Framing households and Subsidized Livestock Framing households in amount paid for insurance net of any subsidies. Error bars show 95% confidence intervals.

to livestock risk. Addressing this risk is especially relevant in the context of graduation programs that attempt to address chronic poverty and food insecurity by building up women's assets and income-earning capacity.

We show in this paper that the simple, low-cost intervention of reformulating index insurance to speak to women's risk exposure and expenditure responsibilities significantly increases demand for index insurance.[12] In progress work shows that when purchased, index insurance is a powerful instrument to insulate women's business assets from shocks to the male sphere of economic activity. Specifically, Zheng et al. (2023a) show that women's assets decline substantially and significantly when climate shocks hit the male domain of economic activity and that IBLT in turn largely mitigates those spillover impacts onto women.

The findings in this paper have important implications in other contexts. In particular, wherever crops or assets are gendered, insurance that focuses on production or assets is likely to appeal most to the people with most ownership over what is being insured. In contrast, framing insurance around indirect risk exposure may increase demand for those indirectly affected by negative shocks by making its broad benefits more apparent.

In conclusion, the results of our reformulation insurance suggests that making insurance speak to women's needs and responsibilities is necessary, but not sufficient to bolster demand for index insurance. As an exotic financial tool, our results here show that unless subsidies allow low cost experimentation, then even a well-formulated insurance contract is unlikely to generate the demand that is necessary if index insurance is to play a role protecting the economic gains that women can achieve with graduation programs.

[12]Existing research provides some hints as to potential mechanisms for the impacts observed in this paper. One possibility is that associating insurance payouts with household expenditures increases the likelihood they are spent in that category rather than on supporting or replacing livestock. The idea that labeling cash payments affect their final use is explored theoretically by Thaler (1990, 1999), and there is empirical evidence for this idea in a range of cases including the UK Winter Fuel Payment (Beatty et al., 2014), SNAP benefits (Hastings and Shapiro, 2018), and a lab setting (Abeler and Marklein, 2017). There is also evidence that women's decisions in competitive settings are affected by the form taken by the winnings: Cassar et al. (2016) show that women are more likely to compete when the rewards for winning are for the benefit of their children.

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Appendix

Table A1: Experimental Balance - Baseline Survey

	(1)		(2)		T-test	
	Livestock Insurance		Gender Inclusive Insurance		p-value	q-value
Variable	N	Mean/SE	N	Mean/SE	(1)-(2)	(1)-(2)
% HH head is female	909	0.331	801	0.370	0.097	0.367
		(0.016)		(0.017)		
Age of HH head	826	44.442	720	44.008	0.614	0.886
		(0.595)		(0.619)		
HH size	909	5.590	801	5.437	0.142	0.367
		(0.074)		(0.072)		
Reported earnings winsorized at 95%	909	36126.859	801	38540.310	0.134	0.367
		(1079.822)		(1197.746)		
Business income	909	32038.339	801	34525.553	0.238	0.532
		(1480.021)		(1491.714)		
Women Empowerment Index	909	0.754	801	0.772	0.116	0.367
		(0.008)		(0.008)		
Total business assets	909	3731.997	801	3255.206	0.654	0.896
		(667.369)		(843.127)		
Amount of savings	909	974.565	801	689.757	0.275	0.532
		(222.793)		(115.590)		
At least two sources of income	909	0.466	801	0.557	0.000	0.001
		(0.017)		(0.018)		
CES-D score	909	8.205	801	8.357	0.514	0.772
		(0.152)		(0.180)		
Children Went Whole Day Without Food	551	0.194	480	0.177	0.482	0.772
		(0.017)		(0.017)		
Children Skipped Dinner	551	0.381	480	0.400	0.536	0.772
		(0.021)		(0.022)		
Baseline Household Dietary Diversity Score	909	3.237	801	2.983	0.000	0.001
		(0.037)		(0.037)		
Had A coupon	909	0.154	801	0.166	0.498	0.772
		(0.012)		(0.013)		
Had B coupon	909	0.156	801	0.161	0.785	1.000
		(0.012)		(0.013)		
Had C coupon	909	0.165	801	0.169	0.845	1.000
		(0.012)		(0.013)		
ITT BOMA waves 1–5	909	0.359	801	0.404	0.051	0.225
		(0.016)		(0.017)		
ITT Wave 1	909	0.111	801	0.099	0.402	0.772
		(0.010)		(0.011)		
ITT Wave 2	909	0.064	801	0.095	0.017	0.128
		(0.008)		(0.010)		
ITT Wave 3	909	0.052	801	0.079	0.023	0.130
		(0.007)		(0.010)		
ITT Wave 4	909	0.074	801	0.074	0.997	1.000
		(0.009)		(0.009)		
ITT Wave 5	909	0.058	801	0.059	0.974	1.000
		(0.008)		(0.008)		

Notes: Summary statistics for the sample in each treatment arm. Data for this table collected in February and March of 2018 during the first survey round of the REAP impact evaluation.

Table A2: Amount paid - Intensive margin - Sales window of season 2022-I

	(1)	(2)	(3)	(4)
	OLS	Tobit - full sample marginal effect for uncensored	OLS	Tobit - full sample marginal effect for uncensored
Gender Inclusive (GI)	173.1	412.0**	249.4	367.9**
	(506.0)	(177.0)	(496.7)	(167.5)
Constant	8276.4***		7485.9***	
	(1139.8)		(1122.5)	
Observations	197	1710	197	1710
Additional Controls	No	No	Yes	Yes
Mentor FE	Yes	Yes	Yes	Yes

Notes: Standard errors clustered at the manyatta level in parentheses. Regressions with additional controls include dummies for insurance purchases in any of the three previous sales windows and BOMA project participation wave. *** p<0.01, ** p<0.05, * p<0.10.

Figure A1: Frames from Gender Inclusive Comic Strip

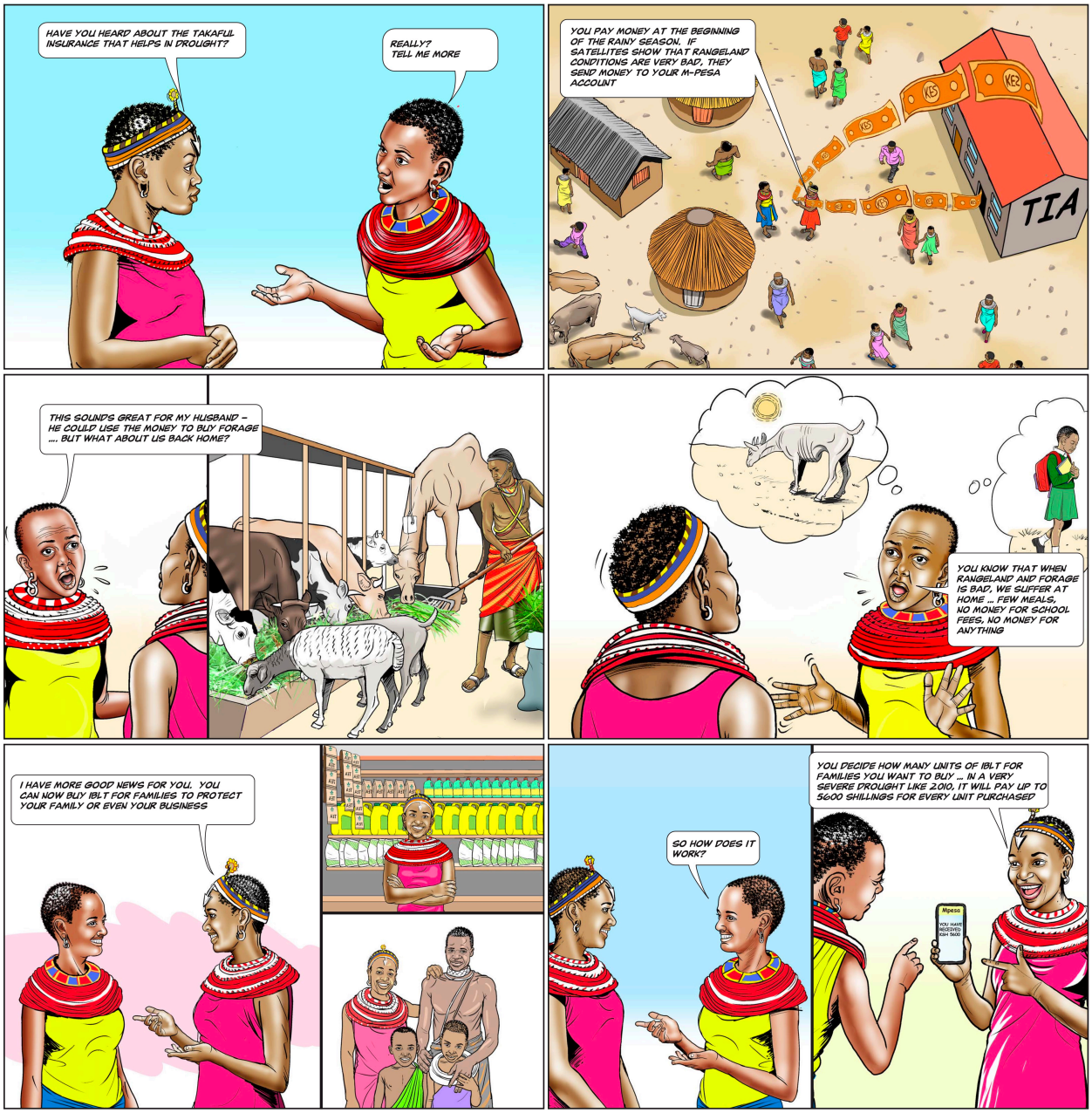

Figure A2: Frames from Conventional Livestock Framing Comic Strip