Indemnity Payouts, Learning from Others and Index Insurance Uptake

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Abstract

Index insurance has gained wide-spread recognition as an instrument for reducing uninsured risks among poor households in developing countries, however its uptake rates have remained low. In this study, we analyze index insurance uptake by focusing on the role of indemnity payouts and social learning on subsequent index insurance purchases among households in the Borena region of southern Ethiopia. We find that receiving an indemnity payout by itself does not necessarily improve uptake. We also do not find any evidence of social learning through knowledge of payout recipients nor through learning about index insurance from one's social networks. However, we do find that increased index insurance knowledge and reduced premium pricing are positively correlated with index insurance uptake.

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Introduction

Index insurance has gained widespread recognition as an instrument for reducing risks, especially among poor households in developing countries. Index insurance bases indemnity payments on an exogenous, publicly observable index such as rainfall that is highly correlated with actual losses, as opposed to a payment based on an individual client's realized losses. As such, it minimizes problems with moral hazard and some types of adverse selection that are common with conventional insurance schemes, which indemnify individual losses. Use of a publicly observable index also eliminates the need for in-field assessments, thereby lowering the administrative costs of insurance programs. In theory, an optimally designed weather index-based insurance product can address many market failures, mitigate underinvestment in more profitable agricultural technology, and increase productivity even among risk-averse individuals (Barnett, Barrett, and Skees 2008).

Impact studies from index insurance pilots in parts of Asia and Africa show that index insurance generates significant welfare gains in terms of household incomes, consumption, child health and access to financial markets (Alderman and Haque, 2007; Karlan et al. 2014; Jensen, Barrett and Mude 2016). However, despite the potential welfare gains of index insurance, rates of adoption have remained quite low, rarely rising above 30 percent of the intended population. For instance, researchers have found adoption rates of 4.6 percent in India, 17 percent in Malawi, and 12 percent in Ethiopia (Giné and Yang 2009; Cole et al. 2013; Takahashi et al. 2016) respectively. The commercial viability of index insurance as a risk coping strategy will be determined by demand trends. Past studies have attributed low demand to liquidity constraints, basis risk (the discrepancy between realized loss and indemnity payouts, representing losses predicted by the index), the high cost of premiums, low financial literacy, and a lack of trust in the insurance

providers (Cole et al. 2013; Giné and Yang 2009; Mobarak and Rosenzweig 2012; Matul et al. 2013; Jensen, Barrett and Mude 2016; Takahashi et al. 2016).

Despite the important role that indemnity payouts play in affecting consumers' preferences for insurance, evidence on the relationship between indemnity payouts and index insurance uptake remains scarce (Stein 2014; Karlan et al. 2014). Theoretically, index insurance if purchased, should improve household welfare ex-ante regardless of whether there is an indemnity payout as the expected utility from the insured asset is at least as high as the expected utility of the asset without insurance (Hirfrfot et al., 2014). Indemnity payouts are known to affect uptake in three major ways: 1) a payout relaxes household liquidity constraints associated with low uptake, 2) it builds customer trust in the product and 3) over time, lessons learned by insurance adopters, including indemnity payout experiences, will filter through to other households, generating higher aggregate demand (Matul et al. 2013; Stein 2014). However, if people misunderstand the premise of index insurance, expecting that the costs of insurance will be offset by indemnity payouts, differences between expected and realized outcomes may erode demand for index insurance products. According to Stein (2014), if clients are unfamiliar with how insurance works, they may be heavily influenced by their most recent experiences with insurance and by the experiences of their friends and neighbors. This fact motivates the major research question we address in this paper: What is the impact of indemnity payouts on subsequent index insurance purchases? We analyze the impact of indemnity payouts on subsequent purchase decisions among the recipient households and among households in the social networks of recipients.

We use a three-wave panel dataset from the Index Based Livestock Insurance (IBLI) in southern Ethiopia to contribute to existing empirical studies on the impact of indemnity payouts on index insurance demand. IBLI is an index insurance product that makes indemnity payouts based on an observable, exogenous index of rangeland conditions, as reflected in Normalized Difference Vegetation Index (NDVI) measures generated by remote sensors on satellite platforms. An IBLI policy provides indemnity payouts when pasture vegetation falls below a contractually stipulated threshold level that reflects the onset of drought conditions that typically lead to excess livestock mortality (Chantarat et al. 2013).

Our analysis differs from the previous studies in a number of ways. Most importantly, to study neighborhood effects, earlier studies have aggregated payout at the village level. Aggregating payout at the village level masks several unobserved and unmeasurable factors that can affect individuals' insurance purchase decisions. This study extends the existing literature by examining the impact of payout and existence of peer learning at the household level.

We find that households that receive indemnity payouts are less likely to purchase index insurance in the subsequent periods compared to households that are not aware of indemnity payouts. This is also reflected in the low number of recipients of indemnity payouts who repurchased insurance in the subsequent period (16 percent). We do not find any evidence of social learning through knowledge of payout recipients nor through learning about index insurance from one's social networks.

Study Area, IBLI and IBLI Design

The study was conducted in the Borana rangelands, situated in the Oromia region of southern Ethiopia. The region covers about 95,000 km^2 and is an arid to semi-arid ecological zone

characterized by a bimodal pattern of rainfall, with the long rains falling between March and May, and the short rains between September and November. The ecological environment of the Borana rangelands is more suitable for extensive grazing than for crop production, due to the erratic nature of rainfall (Coppock 1994). The majority of the population are pastoralists whose livelihoods depend primarily on extensive livestock grazing. They mainly herd cattle, and to a lesser extent, goats, sheep and camels. Due to frequent droughts, widespread livestock mortality limits pastoralists' capacity to fully exploit the potential of livestock as a main source of livelihood leading to classical poverty traps (Lybbert et al. 2004; Barrett, Carter, and Little 2006).

IBLI was introduced by a consortium led by the International Livestock Research Institute (ILRI) in collaboration with the Oromia Insurance Company (OIC) in August 2012. IBLI is an innovative microinsurance product that insures pastoralists in the arid and semi-arid lands (ASALs) of Borana against the widespread livestock mortality events that often follow catastrophic drought. Like other index-based insurance products, the contracts are designed around a publicly observable index that is calibrated to be highly correlated with losses. IBLI is marketed and sold over the course of two periods occurring directly before the two rainy seasons (August-September and January-February). Insurance coverage periods last one year and offer the potential for two indemnity payouts, one after each dry season. If a household buys IBLI in the August-September sales period, it is insured from October to September of the following year and may receive an indemnity payout in March and/or October. If a household buys IBLI not nly in the January-February sales period but also in the following August-September sales period, then the insurance coverage periods for the two contracts overlap from October to February and the household may receive indemnity payouts for both contracts in October. This

temporally-overlapping design allows households to insure the same number of livestock but pay less on more frequent intervals and is, therefore, expected to reduce the cash constraints faced by pastoralists. The cost of the IBLI contract for household is equivalent to:

$$premiumh = premium\ ratew * TIHVh$$

where $premium\ ratew$ is a Woreda[1]-specific insurance premium rate given spatial differences in expected mortality risk and $TIHVh$ is the total insured herd value based on the number of each livestock type the household chooses to insure, calculated as:

$$TIHVh = (\#\ camel\ insured * pcamel) + (\#\ cows\ insured * pcow) + (\#\ shoats1\ insured * pshoat)$$

Sample and Data

Sampling for the household survey was clustered at the Reera[2] level. We surveyed 17 Reeras across eight Woredas in Borana: Dilo, Teltele, Yabello, Dire, Arero, Dhas, Miyo, and Moyale. These study sites were selected to maximize geographic distribution and capture agro-ecological and livelihood variation. For the selected Reeras, a household roster containing the name of the household head and Tropical Livestock Unit (TLU[3]) holdings was compiled. Households in the census were then split into wealth terciles based on the number of livestock held. Then, 15% of households per study site were selected for the sample, one third from each of the livestock holding terciles. The baseline survey was conducted in March 2012 among 515 households. This survey occurred before IBLI was developed and, therefore, before respondents had not been exposed to the IBLI training or marketing. After the baseline, in August-September 2012, the

[1] Woreda is the third-level administrative divisions in Ethiopia, below region and zone.
[2] A reera is a unit of grazing administration, which comprises several villages.
[3] One TLU is equivalent to one cow, 0.7 camel, 10 goats, or 10 sheep

first IBLI contracts were sold to pastoralists in the study area. In January-February 2013, the March 2013-February 2014 contracts were offered, followed by a follow-up survey of the original sample households in March-April 2013. Contracts sales were repeated in the August-September 2013 and 2014 and January-February 2014 and 2015. Survey rounds 2, 3 and 4 were conducted in March 2013, 2014 and 2015 respectively. Each survey round asked detailed questions about household characteristics, composition, and activities; livestock holdings; income-generating activities; durable and non-durable assets; knowledge and experience of IBLI; and risk preferences. In-order to maintain a robust sample size, new households with similar TLU holdings were added to replace households lost to attrition.

To enhance IBLI uptake and in-order to provide an experimental treatment that could be used to identify the impacts of IBLI uptake statistically, various encouragement designs were randomly implemented in each of IBLI sales periods. These included distribution of premium discount coupons prior to all IBLI sales periods. Recipients of discount coupons were randomly assigned to discount categories that would allow them to purchase IBLI for up to 15 cattle (or equivalent value of other livestock species) at a discount below the unsubsidized policy premium. In each sales period, about 80 percent of sample households were randomly selected to receive discount coupons, of which 10 households received IBLI free of charge. The rest of the discount coupon recipients were offered discounts that were evenly distributed across 10 percent increments between 10 and 80 percent. In the January/February 2015 sales period, about 78 percent of the households received discount coupons that cut the cost of the premium by approximately 37 percent. This created exogenous variation in the effective price faced by prospective buyers.

Within the period of our study, one payout transpired in November 2014, in which payouts were distributed to households depending on the number of TLUs insured. The payouts were based on IBLI purchases made in January/February 2014. The average indemnity payout amount was ETB 5,741 (US$208), with a minimum of ETB 75 (US$3), and a maximum of ETB 50,000 (US$1,815). An ex-gratia payment was included in the actual indemnity amount for two reasons: to boost the net payout and to test the sensitivity of insurance demand to liquidity constraints in the January/February sales window. The payout ceremony was a community event held at the main trading center in the Borana zone. Literature shows that public community indemnity payouts induce trust and help demonstrate the tangible benefits of index insurance to the potential policy holders (Matul et al. 2013).

In the 2015 survey, information was collected about the indemnity payouts, this include; if households were aware of the indemnity payouts, if they attended the ceremony and if they received the payouts. If a household had not received an IBLI payout themselves, they were asked a follow-up question about whether they know households within their Woreda who were recipients. Information regarding IBLI social networks was also collected. This information was collected by randomly selecting households from the same Woreda and asking the respondent if they personally knew that matching household and if the matching household's IBLI purchasing decisions. While time limitations prevented the enumeration of a household's full social network, it provides more precise information than a relatively common approach of assuming that a household will be aware of the choices and outcomes for other households in the same Woreda.

Summary statistics

Table 1 gives the summary statistics for the whole sample and each category of January/February 2015 IBLI purchasers and non-purchasers. The average household size is 6.9 persons. Seventy-eight percent of the households are headed by males, and household heads have an average age of 52 years. The study area is predominantly occupied by the Borana ethnic group. The education level is low (0.62 years of formal education) compared to the national Ethiopian average of 4.7 years (Mcintosh, Sarris, and Papadopoulos 2013). Non-purchasing households tend to be more educated than purchasing households and score significantly higher in IBLI knowledge and financial literacy questions than purchasing households.

The average monthly income is approximately 4000 birr (US$145) which translates to 589 birr (US$ 22) per capita. Approximately 82 percent of the income is generated through livestock-related activities like sales of animals, milk and other animal products. Other sources of income include crop production and off-farm activities. The monthly household consumption is approximately 400 birr (US$ 15), 82 percent of which is spent on food-related expenditures. The average livestock holding is 20 TLU, primarily composed of cattle with some camels, goats and sheep. IBLI purchasers have higher value of TLU than non-purchasers. The average stock growth rate is3 percent and the mortality rate was also approximately 6.9 percent.

Following Biswanger (1980), respondents participated in an experiment to elicit a measure of their risk preferences. The experiment was performed as a lottery, where each respondent was offered a coin toss gamble with real cash payments in Ethiopian Birr. The possible choices included: (50, 50), (45, 95), (40, 120), (30, 150), (10, 190), and (0, 200) with an outcome range

from risk neutral to extremely risk averse We define three categories of risk preference by combining the first two, middle two and last two options to place respondents into categories corresponding to high risk aversion, moderate risk aversion and low risk aversion respectively. The results show that 12, 46 and 42 percent of the households exhibit high, moderate and low risk aversion behaviors, respectively.

Table 2 shows the specific IBLI characteristics related to the indemnity payouts and IBLI purchases in the January/February 2015 sales window. The indemnity payouts were based on IBLI purchases made in January/February 2014. The average indemnity payout amount was ETB 5,741 (US$208), with a minimum of ETB 75 (US$3), and a maximum of ETB 50,000 (US$1,815). About 80 percent of the January/February 2015 sales period were aware of the indemnity payouts. Only 13 percent of the purchasers in the January/February 2015 IBLI sales window had received indemnity Regarding IBLI social networks and social learning, about 35 percent of the households who did not receive indemnity payouts knew at least one recipient household within their social network. Knowledge of beneficiaries is significantly higher among purchasers than non-purchasers. In terms of social networks and social learning, 75 percent of the household in our sample stated that they received IBLI-related information from their social network. The number of non-purchasers who received information from social networks in statistically significantly larger than purchasers.

To reinforce the effectiveness of indemnity payouts on subsequent purchases, we asked households about the effect of the indemnity payout on their willingness to purchase IBLI in the subsequent IBLI sales. Sixty-one percent of households stated that the indemnity payout made them much more interested in future IBLI purchases, while 10 percent stated that the indemnity

payout made them less interested. However, only 19 percent of the households purchased IBLI although they answered that the payout made them much more interested in purchasing IBLI.

Methodology

To address the question of the impact of receiving an indemnity payout on subsequent IBLI purchases, we estimate two binary purchase decision models. The first analysis uses pre-payout survey data from 2014 while the second analysis uses the post-payout survey data of 2015. We estimate the following model:

$$D_{it} = \alpha + \delta P_{i,Nov2014} + \gamma A_{i,Nov2014} + \beta X_{i,Feb2012} + \mu_i + \varepsilon_{it}$$

where $D_{i,t}$ is 1 if household i purchased IBLI in sales period t, (and 0 if they did not). $P_{i,Nov2014}$ and $A_{i,Nov2014}$ are our major explanatory variables of interest. $P_{i,Nov2014}$ takes the value 1 if household i received IBLI payout in November 2014, a significant, positive estimate of δ suggests that having previously received a payout influences a household to purchase IBLI in subsequent periods. One main concern about our model is that households that receive indemnity payout in 2014 have more information about the product and are more likely to purchase in the 2015 sales period, secondly, a household can only receive payout after making an IBLI purchase, this makes variable $P_{i,Nov2014}$ endogenous and correlated with the error term. To correct for this endogeneity, we use an instrumental variable (IV) based on discount coupons offered to households in 2014. The discount coupons were issued randomly and are purely exogenous, providing an excellent IV. We apply two-step estimation strategy where we first regress receiving indemnity payout against our regressors and in the second model we include the instrumented indemnity payout variable from the first model.

The vector of variables A_i captures the existence of social learning and neighborhood effects. The variables include: indemnity non-recipient household *i* having information about the indemnity payouts and knowing indemnity payout recipients, household *i* receiving IBLI-related information primarily from social networks and household *i* personally knowing an IBLI purchaser within the Woreda. The vector $X_{i,Feb2012}$ contains household i's characteristics in February 2012 before IBLI launched in August 2012, this is aimed at reducing endogeneity concerns and provide an ex-ante picture of the household before IBLI was introduced. These variables include 1) household demographic characteristics such as household size, age of household head, and number of years of formal education; 2) household wealth proxied by household livestock holdings (TLU), seasonal net income, ratio of income from livestock-related activities and household expenditure on food-related items; 3) household livestock mortality; 4) knowledge of IBLI proxied by the number of IBLI-related questions answered correctly; and 5) risk preferences. We also include regional fixed effects to account for differences in condition by region that may affect purchase decisions. The error term μ_i is clustered at the Woreda level.

Results and Discussion

Table 4 presents the results of the first stage regression in our analysis for factors associated with receiving indemnity payouts. Receiving a discount coupon and the premium rates of discount coupons are both positively and statistically significantly correlated with receiving indemnity payouts and are determined exogenously. Therefore, both discount coupon and discount rates variables are valid instruments for the IBLI indemnity payout.

Table 5 presents the results of the regression analysis for the factors associated with IBLI uptake. In model 1, we present the regression results of factors associated with IBLI uptake before payout (January/February 2014 sales period), while models 2 and 3 present the regression results

of IBLI uptake after indemnity payouts occurred (January/February 2015 sales period). Model 2 presents the results of our main variable of interest related to payouts and social learning and in model 3 we include household demographic variables as controls. Both models incorporate the instrumented indemnity payout variable from stage one. Contrary to our prior expectations, the results consistently show a negative and statistically significant relationship between receiving indemnity payouts and subsequent IBLI purchases. A household that receives an indemnity payout is 39 to 64 percent less likely to purchase IBLI in the subsequent period than a household that is not aware of the payout. This could be because of an incongruity between payout expectations and the realization of payouts. For instance, it may be that the cost of premiums is larger than the amount received, while households expected to have payouts cover the cost of the premiums. This could also be associated with the cost of premiums and discount rates. Looking at the sales data, we find about 59 percent of the indemnity payout recipients were beneficiaries of discount coupons that covered more than 50 percent of the cost of premiums. However, only 11 percent of these households received a discount coupon during the January/February 2015 sales period, which could have led to liquidity constraints in the January/February 2015 sales period. These results are consistent with those of (Hill and Robles 2011) who find a negative relationship between indemnity payout and rainfall insurance uptake in Ethiopia. They, however contradict Stein (2014) and Karlan et al. (2014), who find a positive correlation between payout and re-purchase among farmers in India and Ghana respectively.

In terms of peer learning and neighborhood effects, we find a positive relationship between knowing a household purchasing IBLI in 2014 within the Woreda and the probability of purchasing IBLI. On the other hand, receiving IBLI related information from social networks has mixed results for season one and two. In the first model, the coefficient is positive though not

significant, while in the second period, we find a statistically significant negative correlation between learning about IBLI from social networks and the probability of purchasing in the subsequent period. The coefficients are marginally significant and this finding might point to the existence of both positive and negative social learning effects. Cai, de Janvry, and Sadoulet (2015) find that social learning has a positive impact on demand for index insurance. We also find a positive correlation between attending the payout ceremony and probability of purchasing IBLI. Simply attending a payout ceremony and experiencing the payout results in learning about insurance and improves trust in the insurance company and the product being offered.

The financial literacy and IBLI knowledge variable has a positive and significant correlation with the dependent variable in both season one and two. The results imply that a one-unit increase in financial literacy is associated with an approximately two percent increase in the likelihood of purchasing IBLI in the subsequent period. These results are consistent with the findings from index insurance studies in other developing countries (Cole et al. 2013; Takahashi et al. 2016). This might reflect that households with superior financial literacy and better understanding of how IBLI works are more likely to purchase insurance because they better understand its inherent value; however, it could also be the case that purchasing households actively sought out more information before purchasing insurance.

Regarding the cost of premiums, we find that providing price incentives in terms of discount premiums strongly increases the likelihood that a household purchases. We also estimate a regression using the actual premium cost and we find that an additional unit in the cost of premium reduces the probability of purchasing IBLI demand by 12 to 15 percent. Similar results have been reported in several other index insurance studies (Jensen, Barrett, and Mude 2016; Mobarak, and Rosenzweig 2013; Cole et al., 2013; Giné and Yang 2008). We also find that those

households that were aware that the payout included an ex-gratia payment were more likely to purchase index insurance.

With the addition of more controls, we find that households from the Borena ethnicity are less likely to purchase IBLI. This could be associated with many factors including the nature of extension services and effectiveness of the community specific development agents who were trained to deliver IBLI learning materials. We find that education is negatively correlated with the probability of purchasing index insurance. These results are contrary to most other findings on the relationship between education and index insurance uptake (Giné and Yang 2009a and Jensen, Barrett, and Mude 2016). They are however consistent with (Takahashi et al. 2016) who conclude that educated households might have access to alternative insurance or safety net mechanisms through social networks. High risk aversion has a significant negative coefficient. We observe that highly risk averse households are 5.7 percent less likely to purchase IBLI compared to low risk averse households. Past studies have found mixed results. However, our findings are consistent with Cole et al. (2012).

Conclusion

In the past decade, index insurance has gained traction as an instrument for rural financial inclusion and risk reduction among poor rural households in developing countries. As a result, a number of studies have been conducted on the demand for index insurance. Many of the studies have focused on the relationship between index insurance and basis risk, cost of premiums, or financial literacy. Despite the importance of indemnity payouts on the sustainability and scaling of the product, the literature on its impact on uptake remains limited.

We study the impact of a household's receipt of an indemnity payout and learning about IBLI payouts through one's social network on the demand for index-based livestock insurance (IBLI) in southern Ethiopia. Households in this region rely heavily on livestock as their primary source of livelihood. At the same time, they face many challenges including recurrent droughts and narrow financial markets, which IBLI is intended to address. We find that receiving an indemnity payout by itself does not necessarily improve uptake. However, indirectly experiencing indemnity payout through attending community payout ceremony increases the likelihood of subsequent IBLI purchases. We do not find any evidence of social learning through knowing payout recipients within one's social networks. We also do not find a strong evidence of the existence of social learning through learning about IBLI from social networks. However, we do find that increased IBLI knowledge is positively correlated with IBLI uptake. Unsurprisingly, the cost of insurance appears to play an important role in influencing uptake of IBLI. The size of the discount offered to households strongly predicts whether the household purchases a policy or not.

In fact, results related to households' receipt of an indemnity payout may say more about the importance of the discount in uptake decisions than about households' actual experiences. Since

discounts were re-randomized during every sales period, households that received steep discounts in one period may not receive as favorable discount in the next. Since a household could only receive an indemnity payout if they had purchased an IBLI policy—and given the strong relationship observed between discount amount and insurance uptake in 2014, which also constituted the instrument used for payout in 2014—it is perhaps not surprising that households who received a payout (and were thus likely previous recipients of a significant discount on the IBLI policy) were likely to have received a lower random premium discount in the next round. In fact, only 11 percent of the recipient households received a discount coupon of any amount, suggesting that the results related to indemnity receipt may be driven primarily by a dramatic decrease in the IBLI premium discounts received by these households.

Future research on this sample may involve examining subsets of the entire sample population. For instance, analyses on the effect of receiving an indemnity payout among all households that purchased IBLI insurance in 2014 would focus the analysis more directly on experience, while also allowing us to estimate the effect of discount rates offered to households in both 2014 and 2015.

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Figure 1; IBLI Borena Household Survey Sites and Households

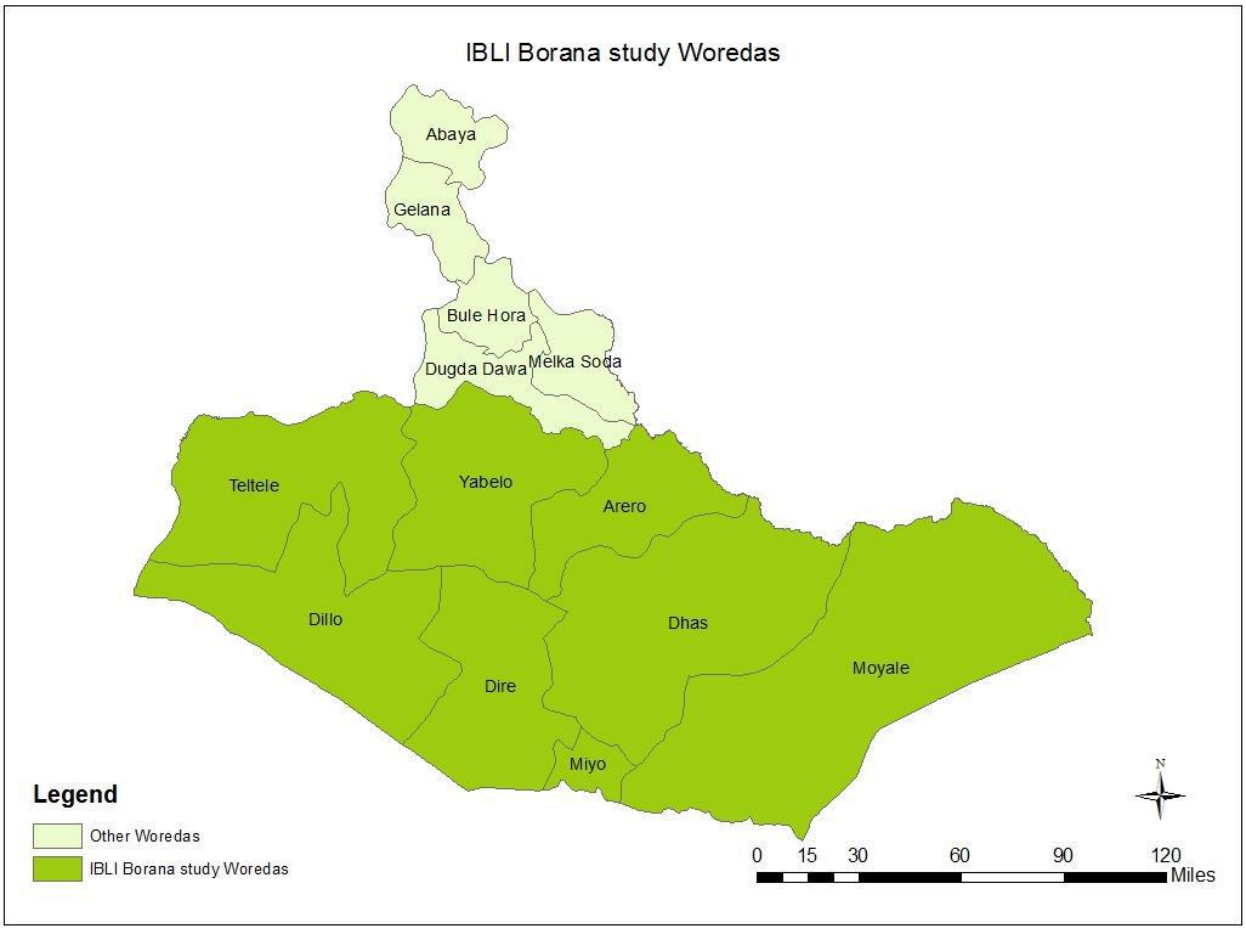

Figure 2; Time structure of IBLI Borena contract

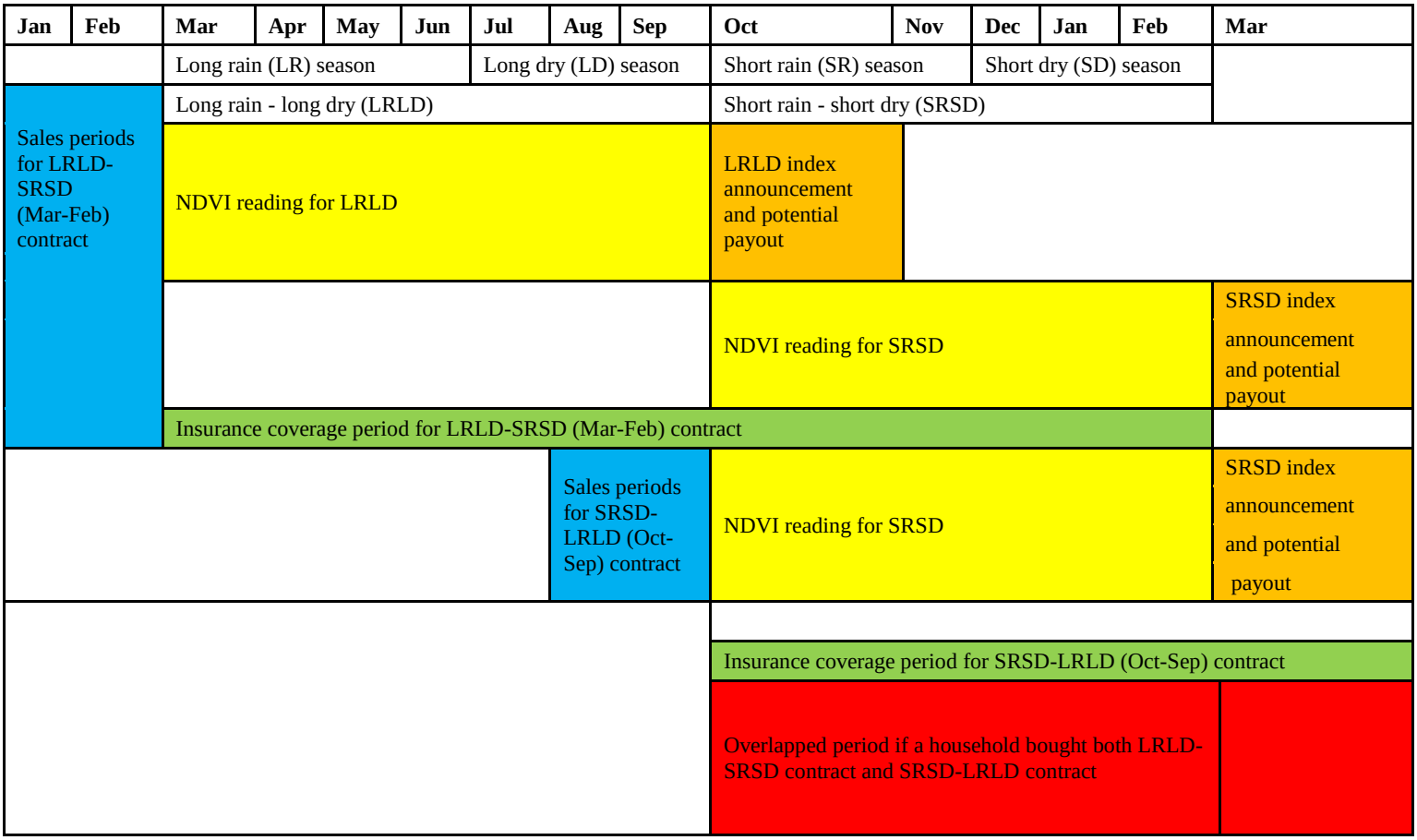

Table 1: Selected Household Characteristics

Household Characteristics	Full sample	Did not purchase IBLI in 2015	Purchased IBLI in 2015	t-test p-value
Demographic Characteristics				
Household size	6.928	6.947	6.787	0.662
	(2.646)	(2.697)	(2.252)	
Age	52.52	52.45	53.00	0.814
	(17.94)	(17.84)	(18.87)	
Male headed households	0.783	0.78	0.803	0.664
	(0.412)	(0.414)	(0.401)	
Education level	0.623	0.625	0.607	0.949
	(1.973)	(1.962)	(2.068)	
# of IBLI knowledge quiz questions correctly answered	4.534	5.098	4.458	0.007**
	(1.741	(1.325)	(1.777)	
Ethnicity (1=Borana)	1.096	1.104	1.033	0.209
	(0.416)	(0.437)	(0.18)	
Religion (1=Christian)	1.494	1.503	1.426	0.637
	(1.179)	(1.178)	(1.19)	
Wealth				
Net annual income (Birr)	16033.4	15968.9	16510.1	0.799
	(16415.3)	(16217.2)	(17949.7)	
Ratio of income from livestock	0.817	0.819	0.805	0.698
	(0.226)	(0.226)	(0.221)	
Total consumption	9615.8	9642.1	9421.7	0.009**
	(4400.1)	(4531)	(3296.7)	
Expenditure on food	6914.8	7112.7	5452.1	0.263
	(15164.3)	(16132.2)	(2037.5)	
TLU	19.92	19.27	24.69	0.1937
	(30.81)	(29.14)	(41.11)	
Risk Exposure				
Livestock Mortality rate	0.0685	0.0712	0.0479	0.267
	(0.113)	(0.118)	(0.0691)	
TLU size growth rate	0.0285	0.0225	0.0728	0.152
	(0.305)	(0.297)	(0.360)	
Risk Aversion				
Low risk aversion	0.424	0.424	0.426	0.116
	(0.495)	(0.495)	(0.499)	
Moderate risk aversion	0.461	0.457	0.492	0.597
	(0.499)	(0.499)	(0.504)	
High risk aversion	0.115	0.12	0.082	0.389
	(0.32)	(0.325)	(0.277)	
N	**513**	**452**	**61**	

Table 2; IBLI related Characteristics

	Full sample	Purchased IBLI in 2015	No purchase	t-test p-value
Indemnity Payout information				
Indemnity payout awareness	0.567	0.803	0.535	0.000***
	(0.496)	(0.401)	(0.499)	
Attended the payout ceremony	0.053	0.115	0.044	0.020**
	(0.224)	(0.321)	(0.206)	
Received payout	0.099	0.131	0.095	0.378
	(0.300)	(0.340)	(0.294)	
Know a neighbor who received payout	0.345	0.525	0.321	0.001***
	(0.476)	(0.504)	(0.467)	
Knowledge of Ex-gratia payment	0.047	0.098	0.040	0.042**
	(0.211)	(0.300)	(0.196)	
Know a neighbor who purchased in 2014	0.355	0.525	0.332	0.003**
	(0.479)	(0.504)	(0.471)	
Source of IBLI info (1 neighbors and friends)	0.756	0.633	0.774	0.009**
	(0.429)	(0.489)	(0.418)	
N	**513**	**61**	**452**	

Table 3: Uptake by change of interest in IBLI due to payout

Did the payout make you more or less interested to purchase IBLI? (N=291)	**Percentage of households**	**Percentage of uptake of IBLI in Jan-Feb 2015 sales period**
Much more interested	61	19
Somewhat more interested	29	13
Less interested	10	14
Total	100	17

Table 4; First stage estimation

Dependent variable; receive payout	Coef.
Receive payout [a]	-0.184**
	(0.060)
Know payout recipient [a]	-0.146**
	(0.064)
Attend community payout ceremony	0.280***
	(0.046)
IBLI info from social networks	0.035*
	(0.019)
Knowledge of ex-gratia payment	0.671***
	(0.048)
Number of IBLI question correctly answered	0.009*
	(0.005)
Knowledge of ex-gratia payment	0.015
	(0.032)
Number of IBLI question correctly answered	0.008
	(0.006)
TLU	0.002
	(0.001)
TLU squared	0.000
	(0.000)
Household size	-0.002
	(0.005)
Household head (male=1)	0.036
	(0.040)
Number of years of formal education of hh head	-0.001
	(0.005)
Age of household head	0.006
	(0.004)
Age of household head squared	0.000
	(0.000)
Ratio of income from livestock	-0.071***
	(0.018)
High risk aversion[b]	-0.031
	(0.035)
Moderate risk aversion[b]	0.002
	(0.029)
Livestock mortality	-0.020
	(0.056)
Ethnicity	-0.013**
	(0.006)
Receive discount coupon	0.032**
	(0.015)

Discount coupon rate	0.001**
	0.000
_cons	-0.292*
	(0.168)
Woreda dummies	Yes
R squared	59
Observations	470

Table 5; Second stage estimation (IBLI uptake)

Dependent variable; purchase IBLI in time t	**Model 1**	**Model 2**	**Model 3**
Receive payout (Instrumented) [a]		-0.395**	-0.645**
		(0.19)	(0.31)
Know payout recipient [a]		0.056	-0.015
		(0.070)	(0.070)
Not aware of payout recipient within social network[a]		0.083	0.016
		(0.070)	(0.080)
Attend community payout ceremony		0.131***	0.204**
		(0.04)	(0.080)
IBLI info from social networks	0.017	-0.071*	-0.059*
	(0.010)	(0.030)	(0.040)
Know_ibli		0.022*	0.016
		(0.010)	(0.020)
Knowledge of ex-gratia payment		0.483**	0.638*
		(0.180)	(0.260)
Number of IBLI question correctly answered	0.017**	0.020*	0.024*
	(0.010)	(0.010)	(0.010)
Discount rates	0.003***	0.003***	0.003***
	(0.000)	(0.001)	(0.010)
Ln net income	0.006		0.01
	(0.010)		(0.010)
TLU	0.007		0.006
	(0.000)		(0.000)
TLU squared	0.000		0.000
	(0.000)		(0.000)
Livestock mortality	-0.072		-0.007
	(0.050)		(0.040)
Ethnicity	-0.043**		-0.139***
	(0.020)		(0.010)
Age of household head	0.005		0.002*
	(0.000)		(0.000)
Age of household head squared	0.000		0.000
	(0.000)		(0.000)
Household size	0.005		-0.004

	(0.010)		(0.010)
Household head (male=1)	0.037		0.024
	(0.040)		(0.010)
Number of years of formal education of hh head	0.009		-0.003
	(0.010)		(0.000)
Ratio of income from livestock	0.017		-0.061
	(0.050)		(0.060)
High risk aversion[b]	-0.05		-0.057*
	(0.03)		-0.03
Moderate risk aversion[b]	0.022		0.021
	(0.04)		(0.02)
Constant	-0.102	-0.181*	-0.17
	(0.190)	(0.080)	(0.110)
Woreda dummies	Yes	Yes	Yes
R squared	21	14	12
Observations	479	505	470

[a] Not aware of indemnity payout
[b] Omitted category is low risk aversion
Clustered standard errors at the study-site level are in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 6; ***Analysis for repeat purchasers***

Dependent variable; Repeat purchaser=1	
Receive payout[a]	-0.132**
	(0.05)
Know payout recipient[a]	-0.025
	(0.04)
Not aware of indemnity payout[a]	-0.062*
	(0.03)
Payout attendance	0.148*
	(0.08)
Know IBLI from social networks	-0.001
	(0.01)
Number of IBLI questions answered correctly	0.028***
	(0.000)
Discount rate	0.002***
	(0.000)
Knowledge of IBLI client	0.04
	(0.02)
Knowledge of ex-gratia payments	0.136*
	(0.080)
_cons	0.072*
	(0.03)