Client satisfaction and product understanding as drivers for insurance renewal - A case study in Mali

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Abstract:

Agricultural microinsurance is a promising risk management tool for smallholder farmers. However, adoption rates remain low and only a small share of farmers renews their policy after the first period. Yet, it is essential for the sustainability of an insurance scheme to retain a solid customer base. To date, it is largely unknown what drives the decision to renew an agricultural microinsurance policy. We address this question by performing mean comparisons and logistic regressions based on collected primary data on 479 smallholder farmers in Mali who purchased a weather index-based insurance in 2020. Results show low levels of product understanding among all clients, but especially among those who did not renew. Similarly, the level of satisfaction was considerably higher among clients who renewed. Both factors were confirmed as drivers for renewal. In line with previous findings, the receipt of a payout had the strongest effect on the renewal decision whereas harvest loss in the most recent season did not influence the renewal decision. We conclude that paying special attention to customers' needs is crucial for the long-term success of an insurance scheme. Also, additional efforts to promote understanding of agricultural insurance among smallholder farmers are recommended.

Keywords: agricultural microinsurance; microfinance; renewal; risk management; rural development.

JEL Codes: G52, Q140

1 Introduction

With increasing frequency of extreme weather events such as droughts and floods, agricultural microinsurance gains importance as a risk management tool for smallholder farmers. Especially index-based insurance schemes seemed to pave the way for microinsurance success through providing indemnities based on objectively measurable factors that are highly correlated with yield losses. Thereby, they largely overcome adverse selection and moral hazard, eliminate costly and time-intense on-farm loss assessments, and facilitate the sales process as the product is relatively easy to understand (Barnett and Mahul 2007).

Although perceived as a promising tool, adoption rates often remain low and are, thus, a prominent research topic (Platteau et al. 2017). While knowledge on the adoption decision is crucial for insurance providers to successfully attract the target group, it is equally important to keep these early adopters and to build a loyal client base. The share of clients that renews their policy for the next period is coined as renewal rate. Since insurance do not only pool risk across their clients but also over time, the renewal rate is not only a sign for client satisfaction but also an important determinant of financial sustainability of an insurance scheme (Apostolakis et al. 2015).

Despite its importance, only little is known about the renewal decision of microinsurance policies (Platteau et al. 2017). The decision to renew differs from the adoption decision in that the policy holder already gained a first experience with the product. Hence, findings regarding drivers of adoption cannot be transferred directly as some factors may lose importance while other additional influence factors need to be considered. The most obvious additional factor is whether or not a client received a payout which, in theory, should be closely linked to the occurrence of a harmful event. So far, studies assessing renewal dynamics of weather index-based microinsurance focused on these aspects and confirmed strong impacts of payouts on the renewal (Hill et al. 2016; Karlan et al. 2014; Stein 2018). Separating effects of the payout and of the triggering event revealed that it is the payout itself and not the triggering event that increased the likelihood for renewals (Cole et al. 2014; Stein 2018).

Focusing only on payouts and triggering events, however, disregards other potential influence factors such as marketing efforts, product understanding, and socioeconomic characteristics. For insurance companies in the agricultural sector, these aspects are of high relevance as they may have implications for client management throughout the product cycle. Some of these aspects such as product understanding and perceived service quality have already been analyzed

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for health microinsurance programs (Dong et al. 2009; Platteau and Ugarte Ontiveros 2021). To date, it remains unclear if similar influences can be observed for agricultural microinsurance renewal since there is – to the best of our knowledge – no study yet that provides a holistic perspective on the renewal decision.

The objective of the present study is to close the described knowledge gap and to shed light on the renewal decision as a whole in order to promote sustainable microinsurance programs. Therefore, we aim at answering the following research questions: are there systematic differences between customers who renew and those who don't renew their weather index-based insurance policy? What are drivers for renewal? How do self-stated motives for adoption differ from self-stated motives for renewal? To address these questions, we conducted a case study on the private insurance provider OKO Finance Limited who issues weather index-based insurance policies in southern Mali. We took a quantitative research approach based on a cross-sectional dataset of 627 farmers whereof 479 were insured in 2020 and 282 respondents renewed their policy for 2021. The results of our study are of special relevance to practitioners striving for long-term viability of the insurance programs they offer. We also address policy makers when highlighting the need to further promote financial literacy and thereby the understanding of insurance products.

2 Literature background

In general, evidence on the renewal decision of microinsurance is scarce (Platteau et al. 2017). Yet, there are three studies on renewal of three different weather index-based insurance products from three different regions in India. By means of panel regression using data from 2006 to 2013, Cole et al. (2014) found that the likelihood for insurance purchasing increased for all households in the village where someone received an indemnity. With an increase of up to 50 % the effect was highest for people who were already insured. While these village level effects were strong, actually receiving a payout had little impact on the renewal decision of the respective policy holder. Stein (2018) opposed these findings regarding individual level effects. He analyzed a three-year panel from 2005 to 2007 in which renewal rates ranged only between 3.6 % and 18.4 %. He concluded that individuals who received a payout were 9-22 % more likely to renew their policy and did not confirm village level spillover effects. Both studies, Stein (2018) and Cole et al. (2014), stated that it was not the occurrence of a harmful event but rather the compensation payment itself that drove renewal. Hill et al. (2016), in line with Stein (2018), confirmed positive individual level effects of a payout on renewal but did not find

spillover effects. They conducted a randomized controlled trial with soy bean farmers in 2011 and 2012. Their study showed that in general, increasing the insurance premium as well as higher basis risk approximated by the distance to the weather station negatively affected insurance purchase. Looking at an insurance scheme in northern Ghana, Karlan et al. (2014) also found positive individual effects of indemnity payments on renewals. Regarding spillover effects, their findings resemble Cole et al. (2014) as they observed positive effects of payout receipts on the renewal decision of farmers in the same social network.

One line of argumentation for strong effects of payouts on renewals is that experience with the insurance scheme potentially allows to build up trust towards the insurer. Cai et al. (2015) assessed a government-sponsored hog insurance program in China and found positive effects of general trust in authorities with insurance uptake. In another study on hog insurance, Cai et al. (2021) also confirmed that the past experience of farmers with insurance products influences future preferences for insurance attributes, thereby hinting at potentially different expectations for renewal as well.

Another line of reasoning that also underlies the aforementioned spillover effects on the village level argues that receiving a payout increases the understanding for the product, especially for those who did not contract the insurance before (Cole et al. 2014). However, findings by Hill et al. (2016) do not necessarily support this hypothesis. They identified strong positive effects of intensive trainings on insurance understanding for initial insurance uptake but these effects did not persist in the subsequent year for the renewal decision. Platteau and Ugarte Ontiveros (2021) addressed the topic of insurance understanding in the context of health microinsurance. They argue that there is a difference between understanding a specific insurance product and understanding the general concept of insurance. The better both levels of understanding, the more likely were policy holders to subscribe to the health insurance scheme again. In case the levels of understanding were low, trust in peers was found to compensate limited product understanding, meaning that low levels of understanding still resulted in renewal if their peers, who understood the concept, renewed their policies (Platteau and Ugarte Ontiveros 2021).

Besides payouts, trust, and insurance understanding, Dong et al. (2009) highlighted that the quality of the health services received was brought up as another influence factor for renewal of health insurances. Platteau and Ugarte Ontiveros (2021) followed up on this aspect and assessed the overall level of satisfaction with the health insurance which was closely linked to whether health services were used or not. The level of satisfaction, in turn, was found to be

highly correlated with contract renewal (Platteau and Ugarte Ontiveros 2021). While these patterns also persist in weather index-based insurance remain unclear up to now.

3 Methodology

3.1 Case study context

The present study is based on a cross-sectional primary dataset on 627 maize farmers from Mali who showed interest in (and in majority also took out) a weather index-based microinsurance. Mali is a landlocked country located in West Africa that heavily depends on the agricultural sector in terms of GDP contribution (36.19 % in 2020, World Bank 2022), labor force employment (62.4% in 2019, ILOSTAT 2021) and general livelihoods through subsistence farming (FAO 2017). At the same time, high weather risks put agricultural success at stake. Due to climate change, more extreme dry and rainy seasons are expected. Given that crops are predominantly rain fed, drought hazards in particular are predicted to increase (Tomalka et al. 2020).

The studied insurance scheme was designed by OKO Finance Limited (hereinafter OKO) and is the first agricultural insurance scheme in Mali. It insures against droughts and floods based on satellite derived precipitation data. Strike levels differ depending on the location, time in the season, and the insured crop. Insurance premiums are determined on an individual basis using time series data on weather and site-specific characteristics such as elevation, slope, and proximity to water bodies. As a mobile-delivered insurance, the insurance policy has to be contracted via a mobile phone. If needed, OKO agents facilitate the registration process. In 2020, there were 125 cell phone contract subscriptions per 100 inhabitants (ITU 2021). Even though data on actual mobile phone ownership is not available, the number of mobile phone subscriptions suggests that most likely a large share of Malians can be reached through cell phones. Hence, we assume that the fact that the insurance is distributed via mobile phone introduces only a small sample selection bias.

OKO issued insurance policies for the first time in 2020. While they first focused only on maize insurance, they broadened their product range to four other crops in 2021 as well. Out of 1,815 clients who contracted OKO's maize insurance in 2020, 1,316 clients renewed their insurance for 2021. With a renewal rate of 72.5% in the first year OKO insurance is an ideal research subject for the analysis of drivers for renewal of weather index-based insurance.

3.2 Data

The primary data were collected in an in-person survey conducted in October and November 2021. The time of the survey allowed to capture information on whether respondents renewed their policy for 2021. The target sample size for the study was determined following a stratified sampling approach[1] with an error margin of 5 % for all strata containing insured clients. The sampling was done randomly. Hence, no regional focus was imposed. However, the insurance is only sold in southern parts of Mali so that naturally only clients from the regions Kayes, Koulikoro, Ségou, Sikasso and Bamako region are included in the sample. The collected survey data were complemented by data on compensation payments in 2020 and insurance premiums and payments for 2021 provided by OKO. For the renewal analysis we focused solely on those respondents who were insured in 2020 and for whom information on payments is available. The resulting sample included 479 respondents out of which 282 clients renewed their insurance policy for 2021.

The sample mainly contains male respondents (92.5%) which is assumed to be in line with the target population. For agricultural insurances a predominantly masculine clientele is not uncommon (e.g. Belissa, Lensink, and van Asseldonk 2020; Ghosh, Gupta, Singh, and Ward 2020). The share of respondents who attended at least primary school in the sample equals with 47.2% the ratio among men in Mali (INSTAT and ICF 2019). In order to set sample household characteristics in a greater context, data collected for the Malian Agricultural Survey in 2017 served as a basis for comparison. The household characteristics in the sample largely correspond to typical agricultural households in Mali in terms of housing characteristics (walls, roof, and sanitary facilities) and characteristics of the household head (gender, age, education). The household size, however, is substantially larger than the average farming household in Mali (21.8 persons compared to 11.3 persons). Similarly, the cultivated area is with ca. 15.2 ha higher than the average cultivated area in southern parts of Mali which varies between 7 ha and 10 ha depending on the region. Yet, in the agricultural survey, farmers overestimated their plot size by 27.8 % on average[2] (Cellule de Planification et de Statistiques 2018). In case a similar overestimation applies to our sample, the cultivated area per household still remains on average slightly higher within our sample as opposed to regional averages.

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[1] The first strata contained all clients who registered for information about the product, but finally did not take out an insurance. Clients who bought the maize insurance policy in 2020 were divided into four stratas based on the receipt of an indemnity (yes/no) and the decision to renew (yes/no).

[2] In the course of the survey, plot sizes were measured using GPS technology. At the same time the farmers were asked to state the respective plot size, thereby allowing a comparison between measured and self-stated surfaces.

Regarding mobile phone usage, nearly all respondents in the sample owned a cell phone and more than half of the respondents used it frequently. Given the earlier mentioned mobile phone subscription ratio in Mali, this level of mobile phone use most likely corresponds to national averages. Three quarter of the respondents also answered that they have a mobile phone with internet access in their household. In Mali roughly 27 % of all individuals were estimated to actually use the internet (ITU 2021) and considering the large household sizes in the present sample, also this share in the sample may relate to Malian averages.

Table 1: Summary statistics (N=479).

Variable	Unit	Mean	SD
Age	years	47.23	12.34
Gender	0/1 (1=male)	0.95	-
No education	0/1 (1=true)	0.28	-
Reading ability	0/1 (1=able to read)	0.52	-
Understanding French	0/1 (1=true)	0.33	-
Household size	persons	21.8	15.08
Gender of household head	0/1 (1=male)	0.94	-
Children per adult	ratio	1.48	1.11
Cultivated area	ha	15.2	13.1
Ownership of a mobile phone	0/1 (1=true)	0.99	-
Frequent use of a mobile phone (i.e. ≥3 times/day)	0/1 (1=true)	0.66	-
Phone with internet access in the household	0/1 (1=true)	0.75	-
Frequency of mobile money use	times per month	2.51	1.62

Note: Mean values for dummy variables (0/1) indicate ratios.

3.3 Empirical strategy

Depending on the research question we took different approaches. We first performed mean comparisons to identify differences between clients who renewed and clients who did not renew their policy. For continuous variables, t-tests for two independent samples, here renewals (n=282) and non-renewals (n=179), were applied. We used Levene's robust test statistic to check for equality of variances and accounted for inequality in the t-tests accordingly (Levene 1960). For binary variables, we performed proportion tests.

To identify drivers for renewal, we ran logistic regressions on the binary outcome whether or not a client renewed the insurance policy using robust standard errors. The model specification followed a specific-to-general approach (Brooks 2008) in order to capture the sensitivity of results when adding additional variables to the right-hand side. The basic model includes the insurance premium requested for 2021, the indemnity in 2020 and the perceived harvest success in 2020. The insurance premium as well as the indemnity are given in CFA-Franc BCEAO

which is pegged to the Euro with a fixed exchange rate of 655,957 CFA = 1 Euro. As more than half of the non-renewal clients did not request an offer for 2021, missing values for the insurance premium in 2021 were replaced by the village averages. For 8 observations district level averages had to be used.

The basic model was then gradually expanded, first to include satisfaction and product understanding, then the risk attitude, before including the agricultural activity, and finally remittances. In all models we controlled for socioeconomic characteristics of the respondent. Reported marginal effects are average marginal effects. Estimating the same specifications using linear probability models confirmed the robustness of our results[3].

In insurance research, a common problem is to distinguish the effects of a payout from the effects of the triggering event leading to the payout since – ideally - the payout should compensate for incurred losses. In index insurance, however, basis risk, resulting from an imperfect correlation between the index used and actual losses incurred, can only be kept minimal but is unlikely to be ruled out. This also holds for the analyzed insurance product, especially since it was their first year of service provision. In addition to that, we used the perceived harvest success in 2020 as a simplified approximation for harvest loss. The clients were asked to rate their maize harvest in 2020 compared to a typical year on a Likert scale. This self-stated assessment was uncorrelated with both payout-related variables. We argue that we do not only solve the problem of endogeneity between payout and triggering event by using the perceived harvest success, but that it is the perception of the loss rather than the actual loss incurred that potentially drives the renewal.

Finally, we looked only at the clients who renewed their insurance policy (n=282) and compared their motivation driving the decision to adopt the insurance and the decision to renew the policy. Therefore, we conducted two-sample proportion tests. The respondents were asked for their motives to subscribe and for their motives to renew. For both questions they could choose multiple answers out of a proposed list of answers. The respondents also had the option to answer freely. Having transformed the answers into dummy variables allowed to conduct the mentioned proportion test to identify changes in the importance of reasons for purchase between the adoption and the renewal decision.

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[3] The results of the linear probability models are not reported here but available upon request.

4 Results

4.1 Mean comparisons between renewals and non-renewals

The mean comparisons revealed that the experience with the insurance product and levels of product understanding differed statistically significantly between respondents who renewed and those who did not renew while there were only minor differences regarding household characteristics between the groups. Results are presented in Table 2.

The most apparent, statistically significant difference was found in the share of clients who received a payout. It was 62.5% higher among clients who renewed their insurance than among the others. The height of the indemnity did not vary significantly between the groups.

Furthermore, the level of satisfaction with the insurance product differed statistically significantly between the groups. Clients who renewed their policy were on average (very) satisfied with the service while non-renewals were rather neutral. With only 5.64 % the overall share of clients who encountered problems with OKO in 2020 was very low. Yet, it was statistically significantly higher among clients who did not renew (9.64% as opposed to 2.84%, p=.002). Yet, the insurance provider solved half of the problems to the satisfaction of the clients.

Similarly, also the level of product understanding differed significantly. Clients who renewed showed substantially higher levels of understanding on eligibility criteria for an indemnity and on how to receive an indemnity. This higher level of understanding is also partially reflected in the differences in motivations to subscribe to the insurance between both groups. With 56.4 % as opposed to 34.8 % a substantially higher share of those who did not renew their insurance stated that they had taken out the insurance merely out of interest in receiving an indemnity. Other less important reasons for subscription were peer behavior and cooperative recommendations. These reasons were more important for those clients who did not renew as compared to those who renewed with both differences being statistically significant. For all other motives no significant difference was observed.

Regarding the households' agricultural activities, there was no statistically significant difference between both groups in terms of cultivated area, perceived harvest success in 2020 or dependency on maize as the insured crop. The share of farmers who also engaged in livestock farming was more than 18 % higher among those who did not renew their insurance compared to those who renewed. In terms of risk experience and expectations, farmers who were insured in 2021 reported on average a slightly but statistically significantly higher number of harvest losses due to droughts or floods during the last ten years and also expected more harvest losses

to occur in the upcoming decade. The latter difference, however, was only significant at the 10 % significance level and has to be taken with caution as roughly half of the respondents did not give any estimate on future harvest losses. Yet, the majority of clients considered themselves as risk averse concerning their agricultural activity. Risk attitudes did not differ significantly between renewals and non-renewals.

Lastly, we did not find a statistically significant difference between renewals and non-renewals in terms of gender, educational level, reading ability, household size, household composition, and mobile phone use[4]. Customers who renewed their insurance were on average three years older than clients who did not renew (45.6 as opposed to 48.3 years, p=.017). Even though the share of female-headed households in the sample was small, it was statistically significantly higher among households who renewed than among non-renewal households (2.54 % as opposed to 8.16 %, p=.009). Given that also the age difference, even though statistically significant, was with three years rather small, the overall differences in socioeconomic characteristics are rather negligible.

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[4] Variables measured as set out in Table 1. Results not reported but available upon request.

Table 2: Mean comparisons between clients who renewed and clients who did not renew their insurance policy for 2021.

		Sample			Not renewed		Renewed	Diff.	SE	p
	N	Mean	SD	N	Mean	N	Mean			
Insurance in 2020										
Amount of payout (in CFA)	281	29,440	23,990	43	27,674	238	29,760	-2086	3980.50	0.601
Payout received [a)]	479	0.59	-	197	0.22	282	0.84	-0.63	0.04	0.000
Premium per ha in 2020 (in CFA)	479	6,375	303	197	6,320	282	6,418	-98	13.88	0.000
Satisfaction with the product	479	0.73	1.37	197	-0.02	282	1.25	-1.27	0.12	0.000
Reasons to subscribe										
Convinced by an agent [a)]	479	0.59	-	197	0.56	282	0.61	-0.05	0.05	0.309
Interest in a compensation payment [a)]	479	0.44	-	197	0.56	282	0.35	0.22	0.05	0.000
More confident feeling for the agricultural season a)	479	0.45	-	197	0.46	282	0.45	0.01	0.05	0.888
Peers subscribed [a)]	479	0.11	-	197	0.14	282	0.09	0.05	0.03	0.089
Recommendation of the cooperative [a)]	479	0.10	-	197	0.13	282	0.08	0.05	0.03	0.053
Insurance understanding										
Correct understanding of eligibility criteria for indemnity [a)]	479	0.80	-	197	0.76	282	0.84	-0.08	0.04	0.029
Correct understanding of payment modalities of indemnity [a)]	479	0.59	-	197	0.48	282	0.66	-0.19	0.05	0.000
Correct understanding why respondent received/did not receive an indemnity [a)]	479	0.75	-	197	0.65	282	0.82	-0.17	0.04	0.000
Overall understanding (sum score of previous, max=3)	479	2.14	0.97	197	1.88	282	2.32	-0.43	0.09	0.000
Past experience & dependency on insured product										
Cultivated area (ha)	479	15.20	13.10	197	14.53	282	15.67	-1.14	1.22	0.350
Dependence on maize [a) b)]	479	0.27	-	197	0.24	282	0.29	-0.06	0.04	0.177
Frequency of harvest losses [d)]	479	2.53	1.21	197	2.33	282	2.66	-0.33	0.11	0.003
Livestock farming [a)]	479	0.36	-	197	0.47	282	0.28	0.19	0.04	0.000
Perceived harvest success in 2020 [c)]	479	-0.57	1.23	197	-0.61	282	-0.55	-0.06	0.11	0.616
Future expectation and risk attitude										
Expected frequency of harvest losses [d)]	246	1.50	1.40	101	1.33	145	1.63	-0.30	0.17	0.086
Risk averse (regarding the farming activity) [a)]	479	0.55	-	197	0.53	282	0.56	-0.03	0.05	0.504
Risk loving (regarding the farming activity) [a)]	479	0.34	-	197	0.34	282	0.34	-0.01	0.04	0.839

Notes: [a] Dummy variables taking the value 1 if variable statement is true and 0 otherwise.
[b] Dependency on maize takes 1 if the majority or the total income is derived from maize cultivation.
[c] Respondents were asked to rate their harvest success in 2020 on a Likert scale where -2 was a lot lower and 2 a lot higher than in a typical year.
[d] A harvest loss was defined as a loss of at least 25% of the harvest in a typical year. The frequency of the harvest loss refers to a 10-year time period.

4.2 Logistic regressions on renewal as outcome variable

The results of the logistic regression models on the binary variable whether or not a client renewed the insurance policy are presented in Table 3 with the base model in column (1) and the full model in the last column (6). Effect sizes and directions of variables included in the base model persisted across all models. While harvest success showed a slightly positive effect on renewal, the coefficient for the insurance premium in 2021 was slightly negative. Yet, both effects were statistically insignificant across all models. In contrast to that, receiving a payout, regardless of its amount, was found to strongly and statistically significantly increase the likelihood for renewal in all models. Even though the effect size reduced when including more explanatory variables, its marginal effect in the full model still indicated a 35.2 % increase in the likelihood for renewal if the client received a payout.

In the second model, we replaced the binary variable for receiving a payout by the amount of payout received which resulted in a substantially reduced model fit. Still, with every additional 1,000 CFA received as an indemnity, ceteris paribus, the likelihood to renew the policy increased by 1.2 %. Given the average amount of payout received (see Table 2), this translates into a similar effect size. However, this statistically significant marginal effect from the second model was outweighed by the binary variable on payouts as soon as both were included in the same model (models 3 to 6).

The level of satisfaction and understanding have been added in the third model, thereby strongly rising the model fit. Given a one unit increase on the 5-point rating scale for satisfaction led, on average and all else equal, to a 7.0 % statistically significant increase in the probability for contract renewal. Similarly, also the understanding of the insurance product was found to have a positive and statistically significant, though smaller impact on the probability for insurance renewal. The effect of understanding did not persist when adding risk attitudes to the explanatory variables. Being risk averse or risk loving as compared to being risk neutral reduced the likelihood for contract renewal by 12.3 % and 13.3 % respectively. These effects remained statistically significant across models 4 to 6 with similar effect sizes. The number of expected harvest losses, in contrast, did not affect the renewal decision.

Table 3. Estimates of logistic regressions on outcome of renewal decision.

	Renewal (0/1)					
	(1)	(2)	(3)	(4)	(5)	(6)
Insurance premium per ha in 2021 [a]	-0.0145	-0.0728	-0.0673	-0.0506	-0.0397	-0.0310
	[0.08]	[0.07]	[0.09]	[0.09]	[0.09]	[0.09]
Payout received (0/1)	3.0297***		2.6751***	2.8265***	2.7941***	2.7892***
	[0.26]		[0.33]	[0.35]	[0.35]	[0.36]
Amount of payout [a]		0.0594***	-0.0057	-0.0051	-0.0044	-0.0037
		[0.01]	[0.01]	[0.01]	[0.01]	[0.01]
Perceived harvest success in 2020	0.0751	0.0533	0.0442	0.0338	0.0468	0.0544
	[0.10]	[0.09]	[0.10]	[0.11]	[0.11]	[0.11]
Satisfaction			0.5374***	0.5852***	0.5949***	0.5681***
			[0.10]	[0.11]	[0.11]	[0.11]
Product understanding			0.2964**	0.2218	0.2332	0.2500*
			[0.14]	[0.14]	[0.15]	[0.15]
Risk averse				-0.9548**	-1.0430**	-1.1098**
				[0.47]	[0.49]	[0.51]
Risk loving				-1.0327**	-1.0365**	-1.0715**
				[0.51]	[0.52]	[0.54]
Expected frequency of harvest losses				0.0302	0.0017	0.0117
				[0.12]	[0.13]	[0.13]
Cultivated area					-0.0085	-0.0105
					[0.01]	[0.01]
Dependence on maize					-0.2865	-0.2188
					[0.30]	[0.30]
Livestock farming					-0.2066	-0.2168
					[0.31]	[0.31]
Frequency of harvest losses					0.1030	0.0827
					[0.11]	[0.11]
Remittances (0/1)						-0.6820**
						[0.30]
Constant	-2.1242*	-0.1309	-2.3303	-1.6530	-1.6900	-1.2264
	[1.27]	[1.06]	[1.42]	[1.52]	[1.60]	[1.64]
Pseudo R^2	0.3270	0.1790	0.3802	0.3890	0.3936	0.4028
N	479	479	479	479	479	479

Notes: [a] Premiums and payouts in 1,000 CFA.
In all models we controlled for gender, age, ability to read, mobile phone usage, and wealth approximation. Standard errors in brackets.
* p<.1, ** p<.05, *** p<.01

Model 5 then revealed small additional explanatory power of agricultural activities and experiences for the renewal decision. Dependency on maize as well as livestock farming decreased the likelihood for renewal while with an increasing number of experienced harvest losses the probability for contract renewals seemed to decrease. However, these effects were not statistically significant. To complete the analysis, we included the binary variable whether or not the household had received remittances in the last 12 months and found a statistically significant negative effect on the renewal decision. In case a household received remittances, it was 8.6 % less likely to renew its insurance policy for the next period.

In all models, we controlled for socioeconomic aspects. Age was found to have a statistically significant positive, yet rather small impact on the renewal decision while all other control variables were found to be statistically insignificant and close to zero in the full model.

4.3 Paired proportions test on drivers for adoption and renewal

Having assessed the drivers for renewal, we were interested in how the drivers for renewal differ from drivers for adoption. The paired sample proportion tests which were performed only on those clients who renewed their policy revealed that there were changes in the importance of the reasons for purchase (see Table 4). With an approval rate of 51.8 %, feeling confident for the next season due to the insurance was an important reason for renewal. Compared to the initial adoption decision, where only 45.0 % named it as a reason for subscription, it gained in importance. Yet, the difference was not statistically significant.

Statistically significant changes were observed for peer influence and the interest in an indemnity payment. Initially, 9.2 % of clients who renewed mentioned peer behavior as a reason for subscription while for the renewal decision, only 3.9 % named their peers renewal as a motive. Similarly, 34.8 % indicated that the desire to receive an indemnity was a motive for subscription, while only 25.9 % gave it again as a motive for renewal. The last reason that was comparable across the decisions was that the possibility of taking out a credit was conditional on subscribing to the insurance. Yet, this reason was neither very popular in the adoption (3.2 %) nor for the renewal decision (2.1 %).

Besides the comparable reasons for purchase, the level of satisfaction with the service is an additional reason for purchase which mattered in the renewal decision but could not influence the initial adoption decision. It was the most important self-stated motive for renewal as 68.1 % of those who renewed named satisfaction as a reason for renewal. Among the clients who did not renew 17.8 % indicated that they did not renew because they were not satisfied with the

service. Dissatisfaction with service thus ranked second behind disappointment at not receiving compensation (27.9 % of those who dropped out) when it comes to the most common reason for drop out.

Table 4. Paired sample proportion tests on initial purchase and renewal motives (N=282).

Motivation for purchase/renewal: I bought the insurance because…	Initial purchase		Renewal		Diff.	SE	p
	Mean	±SE	Mean	±SE			
… others around me did it.	0.092	0.017	0.039	0.012	0.053	0.021	0.011
… I want to receive an indemnity.	0.348	0.028	0.259	0.026	0.089	0.039	0.022
… I feel more confident for my agricultural activity with an insurance.	0.450	0.030	0.518	0.030	-0.068	0.042	0.109
… this is the condition to receive a credit.	0.032	0.011	0.021	0.009	0.011	0.014	0.432

Note: Dummy variables taking the value 1 if variable statement is true and 0 otherwise.

5 Discussion

From the results the following patterns emerge. Insurance payouts were found to be the strongest driver for renewal while harvest losses in the most recent year did not show a statistically significant impact on contract renewal. These findings regarding the individual effects are in line with previous findings (Cole et al. 2014; Hill et al. 2016; Karlan et al. 2014; Stein 2018). While the share of clients who received a payout differed between the groups of renewals and non-renewals, the size of the payout did, as it was expected, not differ between renewals and non-renewals. Given the negative, though statistically insignificant impact of increasing premiums per ha, it is questionable whether implications for product design should be derived from the strong impact of insurance payouts. One could argue that insurance schemes that favor small but frequent payouts are probably more likely to achieve high renewal rates. However, this would come at higher costs and thereby probably shift the clientele towards better off farmers. Hence, this approach needs to be considered carefully.

Secondly, the results included interesting insights on satisfaction. The level of satisfaction differed substantially between those clients who renewed their policy and those who did not. Even though not uncorrelated, the level of satisfaction can not be fully explained by the fact whether or not the client received a payout. The fact that a statistically significantly higher share of clients who did not renew their policy incurred problems with the insurance service suggests that the product experience may have an influence on the satisfaction level as well. Client satisfaction was also identified as a strong and statistically significant driver for contract renewal. This finding was also highlighted as those who renewed their insurance policy mentioned satisfaction with the product as the most important reason for renewal and similarly,

those who did not renew also named dissatisfaction with the product as reason for drop out. Considering these findings, insurance companies should be interested in keeping high levels of client satisfaction.

In line with Platteau and Ugarte Ontiveros (2021) findings on health insurance, another driver for contract renewal in the present case was the level of product understanding. While its impact on renewal was only statistically significant in the third model, its effect remained positive across the other models, too. Even though this suggests only small explanatory power of product understanding for renewal, we also observed large and statistically significant differences in product understanding between renewals and non-renewals. Given the high share of clients who received a compensation in the group of renewals as opposed to the low share in the other group, it is possible that those who renewed their insurance policy learned about the product through the receipt of the indemnity.

Even though our data do not allow to explicitly track knowledge gain, we found supporting evidence that understanding evolved over the course of the insured period in the proportion tests. Among those clients who renewed their insurance, the desire to receive an indemnity was mentioned less often whereas the feeling of confidence for the next season was given more often as a reason for renewal. When arguing that the sheer interest in an indemnity implies that the respondent did not fully grasp the concept of insurance, this would indicate that the levels of understanding increased. Similarly, there was the share of renewals that was done because peers renewed their insurance was statistically significantly lower than the share of initial subscriptions due to peer behavior. Again, this may be due to improved product understanding after a first experience with the product.

Regarding risk attitude and experience our findings were mixed. We observed statistically significant differences in expected and experienced harvest losses which were statistically significantly higher among clients who renewed their policy. Considering that clients who did not renew also diversified their agricultural risk more often by engaging in livestock production, we hypothesize that the risk exposure of clients who renewed was higher than for those who did not renew. This, however, left the risk attitude unchanged and did not translate into differences in risk attitude between client groups based on their renewal decision. However, being risk loving as opposed to being risk neutral showed strong, statistically significantly negative effects on contract renewal. While for risk loving decision makers this effect direct was as expected, farmers who consider themselves risk averse would rather be expected to favor insurance uptake and renewal. The findings of the paired proportion tests also suggested that

the feeling of confidence for the next agricultural season was one very important reason for contract renewal. Hence, it may be possible that this result was caused by measurement errors of the respondent's risk attitude.

Regarding the research question whether there are systematic differences between clients who renewed their policy and those who did not renew, we found mainly differences in terms of product experience as explained with regards to payout and satisfaction. Yet, we do not derive direct implications for a specific target group based on socioeconomic characteristics. Even though there was a statistically significant difference in the average age between both groups, the difference was with three years fairly small and does not imply a necessary focus for an older or younger target group. The statistically significantly lower share of male household heads among renewals compared to non-renewals suggests that female headed households may be more loyal to insurance schemes. However, the sample is with only 28 female household heads too low for strong evidence. Additional research on the impact of female decision makers on contract renewal is required here.

Regarding mobile phone usage, the fact that there were no statistically significant differences in terms of mobile phone ownership, internet access, frequency of use, and frequency of mobile money use gives rise to the assumption that people who are not at ease with mobile phones may have already been excluded during the adoption decision. Consequently, this aspect was not found as a driver for renewal but should be assessed as a driver for adoption of microinsurance.

Nevertheless, we found important and statistically significant differences in the reasons for initial subscription between the two groups. Clients who renewed their insurance policy for 2021 apparently already took the decision to renew more independently than clients who did not renew their insurance. The share of clients who initially purchased the insurance because of peer behavior or based on a cooperative recommendation was statistically significantly lower among renewals. This allows us to assume that referral bonusses to attract new customers can only be considered a long-run investment if efforts are undertaken to ensure high levels of client satisfaction and a good product understanding.

6 Conclusion

The present study takes a holistic perspective on the renewal decision of weather index-based microinsurance for smallholder farmers. We did not find important differences in terms of socioeconomic characteristics between clients who renewed their insurance policy and clients who did not renew. However, the two client groups differed substantially in terms of product

understanding, initial reasons for subscription and product experience. Clients who renewed showed a better understanding of the insurance product, took the decision to subscribe more independently, liked the insurance service better, and received payouts more often than non-renewal clients. The receipt of a payout was also identified as the strongest driver for renewal whereas harvest success in the most recent season did not show strong influence on the renewal decision. Besides these aspects that have already been found in other studies (Hill et al. 2016; Stein 2018), also client satisfaction, and partially also understanding positively impacted the likelihood for contract renewal. These findings were also reflected in the self-stated motives for renewal. Clients who renewed most often mentioned that they renewed because they were happy with the insurance service. We also observed changes in the motives for adoption to the motives of renewal. Peer behavior as a reason for insurance subscription lost in importance whie the feeling for confidence was mentioned more often for the renewal decision. We argue that these changes may be related to an improved understanding of the product due to a first experience with the product.

Our results have two main implications. First, we emphasize that, especially in a developing country where educational levels are rather low, thorough explanations of the insurance product and the concept of insurance more generally, are key for the long-term success of commercial microinsurance products. While it is the insurance providers responsibility to explain the respective product, it is the policy makers duty to promote financial literacy as a whole.

Secondly, we also highlight the need for insurance products that fit the clients needs thereby aiming for high client satisfaction. Up to date, it remains unclear what exactly drives client satisfaction in weather index-based microinsurance. While this implies an attractive venue for future research, it also implies that until specific evidence is generated generally accepted principles of client management should be applied.

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