Commitments vs Flexibility regarding take-up of pension savings accounts: A Randomised Control Trial on Cocoa Farmers in Ghana

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Abstract

The aim of this paper is to examine the uptake of a newly developed long-term savings (pension) product of cocoa farmers in Ghana. Given that cocoa farmers are poor, have fluctuating income, and are exposed to a number of costs between two cocoa seasons, an ideal pensions' product has to combine tailoring for farmers' current financial needs and the financial needs of the future to sustain themselves financially in the old age. We therefore test the difference in uptake of two pensions products where a part of the pension is saved until retirement age, and the other part is flexible and can be used as a regular bank account with no penalties for early withdrawal. Both pension products yield an attractive interest rate (twice the treasury bills rate), but with the first pension product, 50% of savings can we withdrawn at any point in time, and the other 50% is locked until retirement age. With the second product, only 30% can be withdrawn at any point in time, whereas the rest is locked until retirement age.

Our main contribution is that we test the relevance of flexibility vs commitments in terms of uptake of a long-term savings product. We conducted a Randomised Control Trial (RCT) where we randomized the pension products across 21 cocoa communities and 1169 farmers in the Eastern region of Ghana.

We find an overall higher uptake of pensions for individuals with higher income fluctuation, and education level above primary school. The main result of our analysis is that offering a more flexible long-term savings product significantly increase uptake of pensions, but only for, women and those receiving remittances from migrated household members.

I. Introduction

Retirement plans have for the longest of times been an issue in the informal sector, especially in agriculture in rural areas. This is no different for cocoa farmers in Ghana. As much as government or private-sector pension programs exist in the formal sector and urban areas, the informal rural areas rely on traditional means of relying on family members and community for social support in times of need, including old age. With globalization and migration of cocoa farmers' children in towns, this dynamic is slowly changing, creating a market gap where the elderly fall short on support during old age. Even though Cocobod, the government body regulating the cocoa industry and all its proceeds in Ghana, has been planning to introduce a pensions scheme for farmers, none of these plans have come to bear fruit to this day, forcing farmers to work until very old age.

The aim of this paper is to examine the interest and consequent uptake of a newly developed long-term savings (pension) product of cocoa farmers in Ghana. Given that cocoa farmers are poor, and as such, are exposed to a number of unexpected costs that would arise between the two cocoa income seasons, an ideal pensions' product would have to combine tailoring for farmers' current financial needs and the financial needs of the future in order to sustain themselves financially in the old age. A crucial issue regarding uptake of long-term savings product concerns the flexibility that savers have in terms of early withdrawals. According to the standard consumption theory, consumers would value flexibility, and hence would prefer to be allowed to withdraw any part of their savings at any moment in time. This would even become more important if consumers are credit constrained and need liquidity to make them resilient to unexpected shocks. However, assuming hyperbolic preferences, consumers may suffer from temptation, which would, especially for so-called sophisticated selves, imply a preference for commitments. It may also be the case that consumers prefer commitments in case they want to keep the money away from their partners. This may especially be relevant for women, who want to safeguard their money from their husbands. Hence, it is an empirical question whether individuals are more likely to open savings account with or without strong commitment devices. The main aim of this study is to provide more evidence on this important question. Thus, we aim to compare uptake of two types of long-term savings products, which only differ in terms of the part of savings that can be withdrawn freely at any point in time without penalties. More specifically, we offer a random group of cocoa farmers in Ghana the possibility to open a long-term savings account with the possibility to withdraw 50% of the savings at each moment of time, and offer another randomly determined group of cocoa farmers the possibility to open a long-term savings account for which only 30% can be withdrawn at any moment in time. We will test whether farmers on average prefer flexibility or commitment. In addition, we will conduct heterogeneous treatment analyses and thus test for which groups of farmers flexibility or commitments are more important.

There is little literature so far on commitment pension savings, in any context, especially not in the cocoa farmer sector. Grameen introduced a commitment mid-term savings scheme in Bangladesh in the early 2000's which was a huge success, generating millions of its users (Rutherford, 2006). Grameen's resulting net savings outgrew their outstanding microfinance loans, allowing them to offer microcredit at lower interest rate. The program allowed micro-entrepreneurs to save fixed amounts weekly or monthly. If they were 4 months in arrears with payments, their accounts were closed and savings returned to farmers at a market interest rate. However, for those who save for a minimum of 5 years, they get their savings back with a very attractive interest rate. Interest rates were not specified in the study unfortunately, and neither was the socio-economic breakdown of the pensions uptake. A few other studies, on the other hand, highlighted the effect of socio-demographic characteristics on optimal retirement decision. For instance Lusardi and Tufano (2009), van Rooij et al., (2011) found that in general men are better planners than women, and older people are more proactive when it comes

to pensions saving than young people. Also, marital status and the number of children has known to influence the ability to save for retirement, but also type of employment and income size (Hira et. al., 2013, Lusardi and Mitchell, 2007a, 2008, 2011, 2014, van Rooij et al., 2011). Agarwal, Sumit, et al. (2015) on the other hand showed that even when controlling for all economic and demographic characteristics, more financially literate individuals are also more likely to plan for retirement. An overview of extensive literature confirming the influence of financial literacy on retirement savings can be found by Lusardi & Mitchell (2011). Lisa Xu and Zia (2012) show that besides personal characteristics, such as financial literacy, trust in the financial institutions also plays an important role in pensions savings. However, most of these studies were conducted in a developed country context. Among the studies that have conducted the impact of commitment savings in a development context, Ashran et al (2006), Basu & Singh Bisht (2015) among others, have found that offering committed savings products to consumers was a much more effective way of saving, a finding that likewise applies to urban context with high financial literacy (Thaler & Benartzi, 2004). Partially contributing to existing studies, this study also looks at the interest in pensions' program in the rural informal sector and its respective pickup, but for cocoa farmers in Ghana.

Our main contribution is that we test the relevance of flexibility vs commitments in terms of uptake of a long-term savings product. To the best of our knowledge, we are the first who address this question with a randomised controlled trial in the context of cocoa farmers in a developing country.

In the following section, section II, we will elaborate on the relevant findings from our baseline survey. We will also elaborate the existing social security (incl. pension) schemes in Ghana. Section III describes the intervention itself: the pension products introduced and how they fit our theory of change. Section IV summarizes the methodology and results. Finally, section V shows conclusions and ideas for future research.

II. Retirement of cocoa farmers in Ghana

Our sample contains around 1169 farmers of one cooperative in the Eastern Region of Ghana. We conducted a baseline survey in early 2016. Full details can be obtained on request. The survey included a number of general demographic as well as specific socio-economic questions. The demographics show that about 67% respondents were male, and that the average education level is 10 years. Both the mean and median age of farmers in this cooperative is around 54, with around 25% of the total respondents above the official retirement age of 60. Considering that Ghana's median age is 21[1], we can indeed confirm that cocoa farming does not appeal to young people.

Cocoa is a biannual crop, where the main cropping season in Ghana is from August to January and the light-crop season from April to June. Farms which are not properly maintained only have harvest during the main season. Diversification into other farm or non-farm activities enables farmers to better cope with income fluctuations resulting from unpredictable production of this biannual crop. Our survey shows that 82% (1227 farmers) have other farming activities, whereas 45% (670) farmers are involved in non-farming activities. According to our baseline, income diversification into both other farming or non-farming activities is more common among young farmers than old farmers.

Income and savings of cocoa farmers (tables 1, 2 and 3)

Given how little income farmers earn from cocoa, it comes as no surprise that cocoa farmers use low amounts of inputs on their farms. Table 1, 2 and 3 summarize annual income from cocoa production of the farmers we surveyed, and how it differs across demographic data. We created income categories comparable to a local minimum wage in Ghana, a low-wage equivalent in town ($100/month), and a taxi driver wage equivalent in town ($200/month). See table 6 in Appendix. Income from sales of cocoa is surprisingly low. Looking at cocoa income alone, almost 40% of farmers live below the minimum wage equivalent (US$1.9 per day). This implies that any job in town will pay better than this very labour-intensive cocoa crop. Thus it is not surprising that younger generations of farmers find cocoa farming unattractive, and choose to flee to towns in search for better jobs. Those who stay on farms have to diversify their income by other business activities to sustain themselves.

We were surprised to see that 55% of farmers already have a savings account at a bank, from which 89% (44% of total) use that bank account. The greatest majority of them use savings for investments on cocoa farms, other farming activities or non-farming income generating activities; however, not for old age savings. When asked about their interest in taking up pensions, a great majority (92%) said they were interested in saving for retirement. However, we also found that old farmers are less likely to be interested in pensions, especially old farmers with low income.

We found only two qualitative studies which briefly touch upon retirement income of cocoa farmers in Ghana. Echeverri, 2011 and Roekel 2016 have shown that older farmers in Ghana usually have land, but above the age of 60, they are not

[1] https://www.indexmundi.com/ghana/median_age.html

very active on farms nor do they make any farm investments. Typically, their children have migrated to towns, so in absence of the younger generation, farmers often engage in sharecropping (Abusa or Abunu) contracts to let someone else manage the cocoa plantation and harvest the cocoa. Proceeds from these sharecropping arrangements are a source of retirement income for land owners.

Looking at our own baseline survey data, most are land owners (71%, or 1,065 farmers). About 22% (332 farmers) are Abunu farmers, sharecroppers who take over a farm, make all the investments to replant trees, apply input supplies etc., and they give 1/3 of proceeds to the landowner. Another sharecropping arrangement is Abusa farmers, who are simply farm care-takers, and they give 2/3 of their proceeds to the landowners. We have less than 7% (99 farmers) of Abusa farmers in our sample. See table 5 in the Appendix. Our baseline survey indeed confirms that older cocoa farmers are less likely to invest in their farms than the young farmers ($t= - 2.19$, $p=0.03$) but are also more likely to have more land ($t=1.80$, $p=0.07$). We could explain this by inheritance – older people are more likely to have inherited land from their deceased family members. As for their children, the only evidence of potential migration to towns we have from our baseline survey is the amount of remittances they get from their town-based family members. Indeed, we find that older family members, especially women, receive more remittances (regrades of their income and accumulated savings) from migrated family members, than their younger counterparts do ($t= 2.13$, $p= 0.33$). This finding, in combination with the median age proves that indeed, there is a problem of aging cocoa farmers, and that we can suspect that their respective younger family members are likely to be in towns.

Existing models of old-age income security in Ghana

The dynamics of social security shift with urban migration, and so does providing for elderly care. Some studies show that Ghana social security falls short in meeting any formal social security, including retirement plans, given that the majority of the population (an estimated of 80%) works in the informal economy (Baah-Boateng and Turkson, 2005; Tsekpo, 2005). Households in informal economy are normally poor and lack access to broader formal risk and resource pools, partially due to their geographical remoteness, poverty or lack of information between households and insurers (Siegel et al. 2001).

Kpessa (2010) studied how the state, the market and pre-existing social norms interact to ensure old age income support in Sub-Saharan countries. The social protection plans supporting old age or any other type of social security, can broadly be divided into 4 categories: state, market, family, and community. Throughout the last century, Ghana has gone through various stages of these four support structures.

The traditional social support system is structured around the family and the community. Dating back to pre-colonial times, the family was the epicenter of social support, where the nature of social interactions was collective and reciprocal, and extensive family members and community were the only source or risk and resource pooling in times of need or in old age (Hyden, 2005). Throughout history, as well as today in the informal and rural sector, people typically rely on rotating schemes for wealth accumulation against old age income insecurity, or protection against adversities such as illness, unemployment and hardship (Boon, 2007).

On the opposite end of family- and community-based social security systems, we have the state- and market- social schemes. The advent of colonial rule of the British and the French throughout Sub-Saharan Africa brought about these social security programs where one's right to retirement was not a collective effort, but the fruit of one's own effort. The state and market driven social security programs were initially designed to reward 'loyal' civil servants and employees, starting with expatriates, later followed by local population members who remained in service with the government for at least 10 years (Darkwa, 1997). However, anyone within the informal economy, which includes the agricultural and the mining sector, was excluded from the colonial pensions scheme. In the 1990s, Ghana has moved towards pay-as-you-go (PAYG) defined social security schemes under which benefits are directly linked to contributions[2]. In 2000s, Ghanaian social security has officially progressed towards a three-tier pension system comprising a mixture of PAYG benefit and state-defined benefit arrangements (Dorkenoo, 2006). Blue collar workers and the urban middle class enjoy access to this protectionist arrangements, while the rural inhabitants continue to rely on informal social mechanisms (Maclean, 2002).

To summarize, the state and the market-based pension schemes were designed to protect workers in the formal sector and urban areas, the family and community based provisions continue to be the major social protection in the informal sector and rural areas. Today, both mix extensively in Ghana (Kpessa 2010). Elderly find themselves in a vulnerable position where sometimes their children no longer feel obliged to support them (Collard, 2000). This is a direct result of migration, the breakdown of extended family structures and the more self-reliant shift in social structures of Sub-Saharan countries (Apt, 2002). Putting that in the context of cocoa farmers in Ghana, multiple studies have reported a drastic problem of aging farmers, where children of cocoa farmers are moving to towns in search for better paid work opportunities, as opposed to taking over the farms of their parents. This modernization begs the question: is this shift towards a more self-

[2] For a delicate summary of the social security system in Ghana since the colonial days, refer to Boon, 2007.

reliant trend in social security affecting elderly cocoa farmers, whose family members have migrated to towns? If this globalization trend presents a threat for this generation of elderly, we expect they would be more likely to start saving for retirement. This would then exemplify the generation of farmers who are trapped between the traditional collectivist family- or community-based risk-pooling and the opposite – the new state or market driven system where everyone is responsible for taking care of themselves. Did social dynamics of rural poor change due to migration to towns?

We can get some insight into this question from our baseline survey findings. First of all, we found that a very high proportion of the surveyed farmers had an individual savings account at a bank already (43%). However, we also found that an even higher proportion – 63% of all farmers – are a part of the cooperative group savings program. Judging from these facts alone, we can see that traditional community-based systems of social security are still quite dominant in Ghana, but that market-based individualistic contributions also play a big part.

Besides determining social security dynamics, our pensions intervention looks at committing savings as a tool to entice farmers to save more. Ashran et al (2006) among others have found that offering savings products to consumers is not enough to entice them to save. Committing, or locking, a part of their savings was a much more effective way of saving, a finding that likewise applies to urban context with high financial literacy (Thaler & Benartzi, 2004). Basu & Singh Bisht (2015) find that locking pensions savings motivated rural entrepreneurs in India to take up long term (pensions) savings. However, as mentioned earlier, cocoa farmers are poor, and poor farmers in general find it more difficult to save because of unexpected costs (Karlan 2014). We therefore want to test the uptake of pension accounts where a part of the pension savings is locked, and the other part acts like a current account with interest, thereby offering flexibility to farmers. To determine the significance of flexibility of a part of pensions savings, we compare the difference in uptake of pensions when 50% of pensions savings is withdrawable, and when only 30% of pensions is withdrawable. This will help us understand to what extent poor households value flexibility combined with commitment savings.

III. The experiment: Offering two types of long-term savings accounts

In order to test the relevance of commitments vs flexibility in the context of a long-term savings product, we set up an intervention with Pension Trust Ghana, a Ghanaian subsidiary of a Dutch insurance company Achmea, which introduced a retirement savings program for micro-entrepreneurs in Ghana. The product is a combination of a pensions and a savings account, where consumers are allowed to withdraw a part of their savings at any point in time to allow for some flexibility for financing emergencies, whereas the other part is locked until their retirement – 60 years of age. Pension Trust Ghana (PTG) is especially interested in the effect of varying the percentage of savings farmers can withdraw, to see its effect on farmers' uptake and the use of pension accounts. For that reason, they introduced two pension products. With Pension A, farmers are allowed to withdraw 50% of their savings at any point in time, whereas the other 50% are saved until their retirement age. With Pension B, they are only allowed to withdraw 30% of their savings, whereas the other 70% are saved until their retirement age. Both long-term savings products are less flexible in terms of saving and withdrawing money than the mobile savings account. In our study, there is a commissioned agent that keeps record of every farmers' pensions contribution in a ledger-booklet received from Pension Trust. The information recorded includes farmer names, the amount of savings he got from each farmer, and the date when the savings were collected. This assigned agent would then walk to the nearest bank and deposit that money on a collective account of the pensions company.

IV. Methodology

The 1500 farmers from our baseline survey were dispersed over 22 communities. Later that year one community was expelled from the cooperative, leaving us with 21 communities, with 1169 farmers . We had randomly selected 3 groups of 7 communities each. For Group one, a representative from the Pension Trust went to 7 selected communities and introduced Pension 1 (50% locked, 50% flexible savings) to all farmers. For group 2, the same Pension Trust representative went to another 7 other communities to introduce Pension 2 (70% locked, 30% flexible savings). In addition, we defined a third group. For Group 3, the pension product was not introduced directly to farmers. Rather, the Pension 1 was explained at a cooperative assembly meeting, which was attended by community leaders from all 21 communities. We deliberately introduced this intervention in order to test whether promotion of the product can also been done at the cooperative level (general assembly meeting), because this had the potential to reduce transaction costs considerably for the Pension Trust.

To study the take up and the use of the two committed pension products, we used Randomized Control Trial (RCT). Here we randomly assigned the 3 treatments to different groups of cocoa farmers. To avoid ethical issues, and spillover effects, we randomised at the community level, rather than individual level. In order to improve balance and power, we first ranked the 21 communities based on weighted averages of a number of relevant independent variables: Number of Farmers per Community, Average Years of Education, Age, Gender, whether they have a bank account already, Cocoa income, Income in Good vs Bad month, Total savings (formal and informal), whether farmers have income from other farming activities, or from non-farming activities, and finally any outstanding debts. After raking communities based on the normalized score of these variables, we assigned 21 communities into triplets, which were then randomly assigned to one of the 3 treatments

(2 pension products) or control per every stratum. We verified whether the randomization resulted in equal groups by performing balancing tests. Table 7 in the Appendix shows that our randomization procedure worked quite well.

We examine uptake by running simple linear probability regressions, of the following form:

$$Y = \sum \beta_i P_i + \gamma X + \varepsilon,$$

where Y is a binary uptake dummy, with a one if an account has been opened, a zero otherwise; P refers to the three treatments (long-term savings product i). The subscript i. refers to pension product 1, 2 or 3, X is a vector of controls; ε is an error term. We cluster all standard errors at the community level to control for within community level correlation of error terms.

We are primarily interested in (a comparison of) uptake of Groups 1, 2 and 3. In principle, due to the randomization, it would suffice to simply compare means of the three groups. However, in order to improve precision of the estimates, we add controls. This also enables us to test to what extent uptake is affected by different controls.

Results

Column 1 of table 8 shows that only uptake of group 1 (pension product 1 offered directly to farmers) differs significantly from zero: on average uptake of group 1 equals around 23%. While average uptake of groups 2 and 3 are positive, they do not significantly differ from zero. Moreover, column 2 shows that uptake in groups B and C do not differ significantly from uptake by group A.

In columns 4 and 5 we ignore farmers from group 3 who could have been offered Pension 1 through community leaders. In line with columns 1, 2 and 3, Column 4 shows that uptake of average uptake of Pension 1 equals 23% (the sum of the constant and the Pension1 coefficient) and average uptake of Pension 27% (the constant). The uptake of both pension products do not differ significantly from each other, though. This also holds in case several control variables are added (column 5). In terms of the control variables, column 5 suggests that uptake is positively affected by the education level in the family: average uptake if higher if somebody in the family followed education above primary level. It also appears that in higher ratio between income in good and bad months in a year incentivizes long-term savings. Apparently, higher income fluctuation attracts more long-term savings. There is also some indication that older individuals are more willing to put money aside for long term savings. Yet, "ageold" (dummy age>54) is not significantly different from zero.

In addition to these simple linear regressions, we test whether there are heterogeneous treatment effects by interacting the treatment dummies with different variables. That is, we test whether for different subgroups uptake of the more flexible long-term savings product differs significantly from uptake of group B. We are particularly interested in the interaction of Pension 1 uptake and personal characteristics, such as age, gender, receiving remittances and education. These regressions are specified as:

$$Y = \alpha + \beta P_1 + \gamma I * P_1 + \delta I + \mu X + \varepsilon$$

where variables represent the constant, Pension 1 uptake, interaction term between Pension 1 and individual characteristics, Individual fixed effects vector, control vector and residual term, respectively. We are primarily interested in the significance of the interaction term, $\gamma I * P_1$.

Table 9 presents uptake regressions comparing Pension1 for group 1 (excluding group 3) with Pension 2 (reflected by the constant). The regressions in the table test whether the uptake of the more flexible pension product for sub-groups differs significantly from the uptake of the more rigid pension product. The results suggest that especially for younger farmers (Column 1), non-remittance receiving (Column2) and female (Column3) flexibility is valued more than commitments. Uptake of the more flexible product is not more incentivized by already having a savings account. In column 5, interactions between all groups are considered: this regression confirms the importance of flexibility a especially for female, non-remittance receiving, below medium age respondents.

V. Conclusions and future research

The main result of our analysis is that "on average" offering a more flexible long-term savings product does not significantly increase uptake. Yet, for younger farmers (age<54), women and those receiving remittances, the flexible pensions product where 50% of savings can be withdrawn at any time before retirement, becomes more attractive, thereby increasing uptake.

It comes as no surprise that households with more income fluctuation (ratio of income in a good month and bad month) prefer more flexibility in uptake of pensions product. Given the seasonality of cocoa crop, this comes as no surprise. Cocoa farmers use savings to offset income fluctuations and smooth consumption, in line with existing studies on savings (Karlan et al. 2014).

Our results suggest that especially women value flexibility over commitments. This especially holds for young women who do not receive remittances and older women who do receive remittances. On the one hand, this goes against the hypothesis that especially woman prefer commitments as they want to safeguard their money from the husbands. On the other hand, this can be explained by women's role in a household. Women in developing countries have historically been known to be responsible for the well-being of the family as a whole. It is normally women who make sure that children's school fees are paid, there is enough food on the table for the whole household. This indicates high current expenditure costs. On the other hand, women in a lot of African countries, including Ghana, are still not allowed to inherit land titles. This means that they cannot lease out their land in sharecropping agreements and use farm proceeds as retirement income, like other old cocoa farmers do. Because of the nature of land titles, women are not in a position to do that. Therefore pensions savings allows them to tailor for their own old age income. Having a flexible product allows women to save for old age as well as tailor to current household needs and unexpected expenses.

To conclude, we find an overall higher uptake of pensions for individuals with higher income fluctuation, and education level above primary school. We also find evidence that especially women, younger people and farmers receiving no remittances prefer flexibility over commitments.

Future research should focus on retention of such long term savings, and how this changes over time. Also, it would be interesting to do a comparative study on migrated household members and their remittances to get more insight into the nature of the effect of remittances of migrated household members on cocoa farmers' pensions saving rationale.

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Appendix 1: Tables

Table 1

Total annual income from cocoa (GhC)	Income equivalence	Frequency	Percent
< 2851	Below minimum wage ($1,8/day)	562	37.39
2851 – 5,244	Min. wage - $100/month	347	23.09
5,244 – 10,944	$100/month - $200/month	325	21.62
> 10,944	> $200/month	186	12.38
0	Missing responses	83	5.52
5,890	Average (excl. missing response)	1,503	100.00

Table 2: Household characteristics for each income bracket

Averages	Income below min. wage (percent)	Income min. wage -- $100 per month	Income $100- $200 per month	Income >$200 per month
Income category (GhC)	< 2,851	2,851 – 5,244	5,244 – 10,944	> 10,944
Age	54.11	54.06	55.96	54.04
Education	10.76	11.14	10.78	10.66
Gender (male%)	58.20	63.55	78.08	76.57
Nr household members	5.28	5.24	5.81	5.48
Nr of cocoa farms	1.73	2.20	2.53	2.46
Total farms size	4.19	7.22	10.56	12.01
Total farms investment	1078.75	1647.28	2027.85	2633.97
Total farmers	562	347	325	186

Table 3. Summary statistics savings (Assumptions: missing response => respondent has no savings account. 0 savings => farmers don't use the account)

	Nr of people per community	Owns bank account		Uses bank account		Coop group savings member		Main reason not to save at a bank											
	(Nr's in *Italics* are estimates based on the nr of respondents)	%	Freq.	%	Freq.	%	Freq.	I don't have money to save (% | total)		I don't trust banks		The bank is too far away		I want to open an account but don't know how		I want to open an account but am not allowed to		I want to open an account but it's too expensive to open	
Abakoase	3,092	.54	136	.375	51	.3456	47	.7258	45	.0968	6	.0645	4	.0484	3	0	0	.0161	1
Abompe	2,405	.55	31	.4839	15	.7097	22	.8571	12	.0714	1	.0714	1	0	0	0	0	0	0
Addokrom	*917*	.39	33	.3333	11	.7273	24	.5	10	.25	5	.1	2	.05	1	.05	1	0	0
Adjeikrom	1,340	.67	84	.5952	50	.8214	69	.7857	22	.1786	5	0		0	0	0	0	0	0
Ahomahoma	1,944	.42	31	.4194	13	.6774	21	.61	11	.28	5	.06	1	0	0	.06	1	0	0
Akwansrem	*722*	.69	26	.6538	17	.8846	23	.13	1	.63	5	0		0	0	0	0	0	0
Apaa	*1,028*	.49	37	.4324	16	.6757	25	.68	13	.16	3	.05	1	0	0	0	0	0	0
Asarekwao	*1,250*	.49	45	.4222	19	.7333	33	.52	12	.17	4	.13	3	.04	1	.04	1	0	0
Asiakwa	9,172	.63	38	.4737	18	.6842	26	1.0	14	0	0	0		0	0	0	0	0	0
Bosuso	4,878	.58	159	.5472	87	.8113	129	.67	44	.17	11	.03	2	.02	1	.02	1	.02	1
Dome	683	.52	50	.32	16	.72	36	.92	22	.04	1	0		0	0	0	0	0	0
Ehiamanky	1,480	.58	91	.5165	47	.8571	78	.74	28	.16	6	.05	2	.03	1	.03	1	0	0
Gyampoman	592	.5	26	.4231	11	.6923	18	.85	11	.08	1	.08	1	0	0	0	0	0	0
Heman	1,000	.5	333	.3814	127	.4054	135	.75	126	.11	19	.03	5	.03	5	0	0	0	0
Juaso	*1,139*	.71	41	.561	28	.4390	18	.75	9	.08	1	.08	1	0	0	0	0	0	0
Koradaso	22,421	.5	26	.4615	1 2	.6538	17	.70	9	.15	2	0		0	0	0	0	0	0
Miaso	796	.3	30	.2667	8	.6333	19	.52	11	.29	6	.05	1	.05	1	0	0	0	0
Nsuapemso	633	.6	40	.375	15	.675	27	.69	11	.06	1	0		.06	1	0	0	0	0
Nsutam	4,722	.61	80	.5	40	.6875	55	.74	23	.13	4	.03	1	0	0	0	0	0	0
Osino	7,490	.73	41	.561	23	.7073	29	1.0	11	0	0	0		0	0	0	0	0	0
Owusukrom	736	.49	63	.4603	29	.8254	52	.63	20	.16	5	.09	3	.03	1	.03	1	0	0
Saamang	2,944	.52	62	.4032	25	.8226	51	.87	26	.03	1	.03	1	0	0	0	0	0	0

Total	**71,384**	**.55**	**754**	**.8926**	**673**	**.6347**	**954**	**.72**	**491**	**.14**	**92**	**.04**	**29**	**.02**	**15**	**.01**	**6**	**.0**	**3**

Table 4. Purpose of farmers' formal bank savings accounts

	Main purposes of bank account savings (proportion | frequency)																							
	Cocoa farming		Other farming		Non-farming business		Home improvements		Food consumption		Education costs		Social events		Certification		Paying debt		Health issues		Old age provisions		To keep money from others		Self insurance	
Abakoase	.38	52	.03	4	.15	20	.06	8	.02	3	.07	10	0	0	0	0	0	0	.01	2	0	0	0	0	0	0
Abompe	.61	19	.13	4	.19	6	.06	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Addokrom	.58	19	.09	3	.15	5	.09	3	.06	2	.09	3	0	0	0	0	0	0	.03	1	0	0	0	0	0	0
Adjeikrom	.49	41	.11	9	.07	6	.05	4	0	0	.10	8	0	0	0	0	0	0	.01	1	0	0	0	0	.01	1
Ahomahoma	.71	22	.16	5	.10	3	.10	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	.03	1	0	0
Akwansrem	.65	17	.15	4	.08	2	0	0	0	0	.04	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apaa	.62	23	.08	3	.08	3	0	0	0	0	.03	1	0	0	0	0	0	0	0	0	.03	1	0	0	0	0
Asarekwao	.56	25	.09	4	.22	10	.02	1	.02	1	.04	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asiakwa	.53	20	0	0	.11	4	.05	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	.03	1	0	0
Bosuso	.38	61	.08	13	.17	27	.06	9	.01	1	.04	6	.01	1	0	0	0	0	0	0	0	0	0	0	.01	1
Dome	.36	18	.1	5	.16	8	.02	1	.02	1	.04	2	0	0	0	0	0	0	.02	1	0	0	0	0	.04	2
Ehiamanky	.56	51	.21	19	.11	10	.03	3	.01	1	.11	10	.01	1	0	0	0	0	.01	1	0	0	0	0	0	0
Gyampoman	.46	12	.04	1	.19	5	.04	1	0	0	.04	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heman	.38	127	.07	24	.16	54	.05	16	.04	12	.07	24	.0	1	0	0	0	0	.01	4	.00	1	0	0	.01	3
Juaso	.29	12	.12	5	.17	7	0	0	.05	2	.02	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Koradaso	.35	9	.12	3	.08	2	.04	1	.04	1	.08	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Miaso	.37	11	.07	2	.30	9	.03	1	0	0	.07	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nsuapemso	.40	16	.08	3	.10	4	.03	1	.05	2	.03	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nsutam	.35	28	.01	1	.14	11	.03	2	.01	1	.04	3	0	0	0	0	0	0	.01	1	0	0	0	0	0	0
Osino	.42	17	.07	3	.12	5	.12	5	0	0	.10	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Owusukrom	.65	41	.35	22	.11	7	.02	1	0	0	.11	7	0	0	0	0	0	0	0	0	.02	1	0	0	0	0
Saamang	.29	18	.06	4	.06	4	0	0	0	0	.03	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**.44**	**659**	**.09**	**141**	**.14**	**212**	**.04**	**64**	**.02**	**27**	**.06**	**90**	**.0**	**3**	**.0**	**0**	**.0**	**0**	**.01**	**11**	**.0**	**3**	**.0**	**2**	**.0**	**7**

Table 5

Farm Ownership status	Farm 1	Farm 2	Farm 3	Farm 4	Farm 5	Total
Landlord	1,066	684	273	93	32	2,148
Abunu	332	293	146	55	21	847
Abusa	99	52	37	17	3	208
Abunan	1	0	1	0	0	2
Lease	3	1	3	1	0	8
Family owned	2	1	1	1	1	6
Mortgage				1		1
Total	1,503	1,031	461	168	57	**3,220**

Table 6

Reason for not taking a loan	**Frequency**	**Percent**
No one offered/ don't know how/where to take a loan	307	35.29
Lending policy of the bank excludes smallholder farmers	252	28.97
No collateral	107	12.30
Convinced they would not get a loan even if they applied	93	10.69
Fear of taking loans and/or not being able to repay	39	4.48
Not eligible	31	3.56
Low priority at the moment	23	2.64
High interest rate	6	0.69
In the process of getting a loan	4	0.50
Other	3	0.34
Total	870	100

Table 7: Balance tests for pensions

VARIABLES	(1) nr_inhabitants	(2) Education_years1	(3) sex1	(4) age1	(5) sav_bank	(6) sav_total	(7) income_goodmonth	(8) income_badmonth	(9) other_farm_act	(10) m10nf_act	(11) loans_dummy
pension1	-335.3	0.726	-0.00750	0.806	-0.0213	142.2	184.6	-37.28	0.0275	-0.0550	-0.00125
	(0.753)	(0.0242)**	(0.911)	(0.655)	(0.595)	(0.622)	(0.681)	(0.735)	(0.632)	(0.242)	(0.964)
pension2	861.0	0.505	-0.108	0.996	0.0227	654.8	12.50	15.90	0.0721	-0.0481	-0.0367
	(0.705)	(0.0728)*	(0.215)	(0.481)	(0.635)	(0.0562)*	(0.959)	(0.841)	(0.0595)*	(0.366)	(0.0348)**
Constant	3,068	10.62	0.338	54.19	0.549	2,749	2,309	823.6	0.795	0.470	0.186
	(0.00138)***	(0)***	(1.91e-05)***	(0)***	(0)***	(0)***	(0)***	(0)***	(0)***	(0)***	(0)***
F- values	0.30	0.29	1.94	0.06	0.81	1.76	0.12	0.19	0.57	0.03	1.74
p - values	.5902	0.5932	0.1783	0.8072	0.3769	0.1992	0.7307	0.6642	0.4572	0.8747	0.2018
Observations	1,169	1,501	1,501	1,495	1,501	1,501	1,501	1,501	1,501	1,501	1,501
R-squared	0.017	0.006	0.008	0.001	0.001	0.002	0.000	0.000	0.005	0.003	0.001

Robust pval in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8: Uptake of long-term savings

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Noconstant	Constant=Pension3	Constant=Pension2	Restricted Sample	Restricted Sample
Pension1	0.228	0.123	0.154	0.154	0.143
	(0.00941)***	(0.338)	(0.140)	(0.153)	(0.165)
Pension2	0.0731	-0.0316			
	(0.252)	(0.786)			
Pension3	0.105		0.0316		
	(0.293)		(0.786)		
Educnew					0.087
					(0.0339)**
Ratioinc					0.000322
					(2.77e-06)***
Sex					0.0352
					(0.292)
Ageold					0.0623
					(0.173)
Hhnumhigh					-0.00511
					(0.877)
Remitd					-0.0203
					(0.654)
Constant		0.105	0.0731	0.0731	-0.0355
		(0.293)	(0.252)	(0.265)	(0.231)
Observations	1,169	1,169	1,169	701	687
R-squared	0.169	0.036	0.036	0.043	0.062

Robust pval in parentheses (based on clustered standard errors; clustered at community level)

*** p<0.01, ** p<0.05, * p<0. The dependent variable in all estimates is a zero-one dummy for uptake of the long-term savings product. Estimates refer to linear probability regressions (OLS).The constant in column 2 reflects Pension3; the constant in

columns 3, 4 and 5 reflects Pension2. Column 1 is estimated without constant. The sample in columns 4 and 5 refers to the sample of farmers that are offered pension products 1 and 2 (thus ignore Pension3). The sample in columns 1,2 and 3 refers to the entire sample.

Variables:

Pension1: Pension A…with most flexibility

Pension2: Pension B…..lower flexibility

Pension3: this is our "control"group: also flexible..but not promoted at farmers level. Promoted at community level

Educnew=dummy variable with a 1 if somebody in household has education level above primary; and a zero if everybody in family has education level primary or lower

Ratioinc = Income in good year/ income in bad year

Ageold = dmmy with a one if age respondent> 53; and a zero if age below 54 (54 is the medium age in our sample)

Hhnumhigh= dummy with a one if more than 5 household members and a zero if lower or equal than 5 (5 is the medium number of households in our sample)

Remitd = dummy with a one if household receives some remittances, 0 otherwise

Sex=gender dummy with a one for female and a zero for male (refers to respondent)

Table 9: Heterogeneous treatment effects

VARIABLES	(Age<54)	(No-remittances)	(Female)	(Already owns bank account)	(All)
Pension1*(1-Ageold)	0.159				
	(0.0588)*				
Pension1*Ageold	0.129				
	(0.323)				
Pension1*Remitd		0.0854			
		(0.447)			
Pension1*(1-Remitd)		0.182			
		(0.0931)*			
Pension1*Sex			0.230		
			(0.0299)**		
Pension1*(1-Sex)			0.109		
			(0.292)		
Pension1*(1-Banks)				0.142	
				(0.161)	
Pension1*Banks				0.146	
				(0.184)	
Pension1*Sex*(1-Ageold)*Remitd					0.0286
					(0.676)
Pension1*(1-Sex)*(1-Ageold)*Remitd					0.133
					(0.251)
Pension1*Sex*(1-Ageold)*(1-Remitd)					0.300
					(0.0210)**
Pension1*(1-Sex)*(1-Ageold)*(1-Remitd)					0.162
					(0.0801)*
Pension1*Sex*Ageold*Remitd					0.207
					(0.0811)*
Pension1*(1-Sex)*Ageold*Remitd					0.00915
					(0.949)
Pension1*Sex*Ageold*(1-Remitd)					0.304
					(0.0391)**
Pension1*(1-Sex)*Ageold*(1-Remitd)					0.109
					(0.483)
Educnew	0.0864	0.0889	0.0843	0.0802	0.0867
	(0.0310)**	(0.0333)**	(0.0402)**	(0.0377)**	(0.0307)**
Ratioinc	0.000319	0.000330	0.000311	0.000328	0.000387
	(2.90e-06)***	(2.99e-06)***	(3.19e-06)***	(2.54e-06)***	(1.75e-08)***
Sex	0.0345	0.0376	-0.0400	0.0391	-0.0485
	(0.310)	(0.265)	(0.341)	(0.246)	(0.351)
Ageold	0.0798	0.0625	0.0664	0.0650	0.0813
	(0.282)	(0.173)	(0.143)	(0.162)	(0.243)
Hhnumhigh	-0.00513	-0.00770	-0.00324	-0.00687	-0.00128
	(0.877)	(0.815)	(0.921)	(0.836)	(0.966)
Remitd	-0.0201	0.0337	-0.0231	-0.0209	0.0349
	(0.659)	(0.457)	(0.609)	(0.647)	(0.327)
Banks				0.0308	
				(0.176)	
Constant	-0.0443	-0.0592	-0.0162	-0.0483	-0.0496
	(0.0708)*	(0.0712)*	(0.626)	(0.107)	(0.0455)**

Observations	687	687	687	687	687
R-squared	0.063	0.066	0.068	0.064	0.082

Robust pval in parentheses (based on clustered standard errors; clustered at community level)

*** p<0.01, ** p<0.05, * p<0.1. The dependent variable in all estimates is a zero-one dummy for uptake of the long-term savings product. Estimates refer to linear probability regressions (OLS).The constant reflects Pension2. The sample is restricted: it refers to the sample of farmers that are offered pension products 1 and 2 (thus ignore Pension3).

Additional variable: Banks=is a dummy variable indicating whether the respondent already had an interest bearing savings account (1; 0 otherwise).