Unlocking the benefits of credit through saving

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Abstract

Access to microcredit has been shown to generate only modest average benefits for recipient households. We study whether other financial market frictions – in particular, lack of access to a safe place to save – might limit credit's benefits. Working with Kenyan farmers, we cross-randomize access to a simple savings product with a harvest-time loan. Among farmers offered a loan, the additional offer of a savings lockbox increased farm investment by 11% and household consumption by 7%. Results suggest that financial market frictions can interact in important ways and that multifaceted financial access programs might unlock dynamic household gains.

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I Introduction

A vast literature on microcredit has found mixed evidence on whether credit access allows households to finance profitable investments and improve key livelihood indicators (Banerjee et al., 2015; Meager, 2018). Even in settings where microcredit has had positive immediate effects on revenues, it often fails to translate into sustained consumption gains or business growth for the majority of households (Meager, 2016).

One possible explanation for this lack of sustained impact is difficulty in channeling increased revenues into future investments due to limited ability to save. For example, if the timing of when the returns from microcredit-enabled investments are realized does not align with the timing of when those additional revenues are needed for consumption or reinvestment, households lacking a safe way to save may struggle to translate increased revenues into desired investments. Households without access to protected saving vehicles may also face pressure to share any increase in revenue with kin, rather than re-invest.

In this study's Kenyan setting, as in many other low- and middle-income countries (LMICs), households that lack access to credit typically also face barriers to accessing other financial services, including savings products that could help them bridge this gap in timing and protect their returns. Therefore, it may be that – rather than being substitute financial services – credit and savings products can serve as complements.

We present novel experimental evidence on the complementarities between credit and savings. In the context of African agricultural markets, large seasonal fluctuations in the price of staple commodities provide substantial opportunities for arbitrage through storage. Despite this, smallholder farmers typically sell their crops immediately after harvest, when prices are low; many buy back grain for personal consumption in the lean season when prices are higher. We build on work by Burke et al. (2019), which finds that credit constraints contribute to farmers' inability to take advantage of this arbitrage opportunity.[1] They find

[1]The lockbox intervention was briefly discussed in Burke et al. (2019) but those results only utilize the first year of project data. The current paper contains the complete analysis of the lockbox experiment.

that a harvest-time loan allows farmers in Kenya to more effectively time their maize sales and earn higher revenues. However, this productive activity did not on average translate to an increase in consumption or other productive investments.

In this paper, we present the results from a contemporaneous field experiment in Kenya in which we randomly overlay access to the harvest-time loan with access to a simple savings technology, namely, a durable, concealable metal box with a key (or "lockbox"). We find that among those who are offered a loan, being offered a savings lockbox enables farmers to move returns (and possibly part of the loan itself) intertemporally, increasing farm investment by 11% and total household consumption by 7% relative to farmers only offered the loan but not the lockbox.

The data suggest that at least two mechanisms are at play. First, the lockbox provides households with a technology to move money intertemporally to times when it is most needed. We see especially large consumption gains from lockbox usage during the lean season, when the marginal utility of consumption is presumably highest. Second, consistent with the idea that lockboxes can shield households against a "kin tax" (Dupas and Robinson, 2013b; Jakiela and Ozier, 2016) we find evidence that in addition to enabling the inter-temporal movement of consumption, lockboxes also increase total consumption. Households that are most interconnected with friends and family at baseline become less likely to provide money gifts or loans to them when they have access to a lockbox.

We present two additional pieces of evidence that bolster the central conclusion that access to savings products helps translate credit-enabled returns into long-run reinvestment and consumption gains. First, we exploit a second source of variation in the Burke et al. (2019) study, which found that returns to loans offered immediately after harvest (in October) yield much higher returns than loans offered three months later (in January). In this paper, we find that the consumption and investment benefits of being offered a lockbox are concentrated among the early loan (October) group, suggesting that access to savings is most useful when combined with access to a profitable investment (facilitated here by

timely credit). A second exercise estimates the effects of a lockbox alone (among households without access to the harvest-time loan), and finds null effects on consumption and farm reinvestment, implying that the results are not the impact of having a lockbox alone. These results point to important complementarities between various financial market frictions, and suggest that multifaceted financial access programs that include access to both credit and savings technologies may be well-positioned to unlock opportunities for virtual cycles of reinvestment and dynamic household gains.

This paper is closely related to a large literature on the role of microcredit in enabling productive investments by households. In the evaluation of six randomized studies Banerjee et al. (2015) find that microcredit access increases borrowing, business creation, and investment, but does not lead to a sustained increase in profit, income, labor supply, and consumption for the average borrower. We also speak to a separate literature on savings in LMICs that highlights the positive impacts that access to savings products – even simple ones like the lockbox studied here – can have on household economic outcomes including income, expenditure, investments and wealth (Brune et al., 2016; Chandrasekhar et al., 2018; Dupas and Robinson, 2013a,b,b; Karlan et al., 2014; Prina, 2013; Schaner, 2018). For example, Dupas and Robinson (2013b) show that a safe place to store cash helps individuals move money inter-temporally and accumulate health savings, and other studies find that commitment savings products enable higher savings (Ashraf et al., 2006).

In contrast to most of this work, we focus on the interplay between access to a savings product and to credit. A handful of recent studies have explored interactions between different types of financial products. Atkinson et al. (2013) find that a commitment savings product allows individuals who are time inconsistent but want to save in the future to transition from a debt-financed to a savings-financed investment path, while Kast et al. (2018) test the impact of a peer group savings program on precautionary saving among a sample of microcredit borrowers. Burgess and Pande (2005) study the impact of access to credit and savings services via large-scale rural bank branch expansion in India and document a

significant reduction in poverty. In a lab-in-field setting, Afzal et al. (2018) show that when expenditures are lumpy, individuals tend to demand both credit and savings products.[2] We contribute to this literature by highlighting the importance of simultaneous provision of two distinct financial instruments, increasing access to both credit and savings, to enable farmers to undertake productive investments, in an experimental setting.

II Setting and experimental design

II.I Arbitrage investment opportunities, reinvestment, and savings access

Agricultural markets in LMICs commonly experience large seasonal price fluctuations. In East African maize markets, prices can rise by over 25% in the months between the harvest and lean seasons. In our study area in rural western Kenya, price fluctuations during the study period of 2013-2014 and 2014-15 were 42% and 45%, respectively (Burke et al., 2019).

These price fluctuations appear to offer farmers a productive opportunity for investment in arbitrage. Rather than sell maize immediately after harvest, when prices are low, farmers can wait to sell until later in the year, when prices are substantially higher. On the other side of the market, farmers who tend to buy maize during the lean season can buy earlier, reducing outlays on the staple commodity. However, we find that most of the smallholders in our sample tend to "sell low and buy high," selling right after harvest when prices are low and buying maize back at high prices later in the year. In particular, in our baseline data we see that over 50% of maize sales occurred when maize prices were low (prior to January).

Why do farmers forgo the seemingly profitable investment of storage? Evidence from Burke et al. (2019) suggests the credit constraints are at least partially to blame. Farmers have large expenses, such as school fees, that come due shortly after harvest. Lacking alternative sources of funds, many feel compelled to sell their crop for low prices at that

[2]Related studies are Kaboski and Townsend (2005); Karlan et al. (2014); Duflo et al. (2011); Suri (2011).

time to pay these bills. Burke et al. (2019) find that offering farmers a loan at harvest-time enables them to invest in maize market arbitrage, holding off selling – for some, even buying – immediately after harvest, and selling later in the season at a far higher price. This investment yields increase in revenues of 1,573 Ksh (about US$18) on an average loan size of 5,476 Ksh (US$63) and has a rate of return of 29%. However, Burke et al. (2019) show that this profitable investment fails to translate into meaningful sustained household consumption gains, nor is there significant evidence that these one-time gains reinvested in future productive capacities, such as farming inputs (see Section IV below).

In this paper, we test one explanation for why farmers have limited ability to convert one-time benefits into sustained dynamic gains, namely that they lack the ability to protect and move profits intertemporally. The inter-temporal movement of profits is critical when there is a mismatch in the timing of when an investment yields returns and when those returns are needed for consumption or reinvestment. To see this more clearly, we divide the year into four periods: (i) Harvest (roughly months September to December), (ii) Post-Harvest (months January to March), (iii) Planting (months March to June) and (iv) Lean (months July to August) seasons. The Harvest season is marked by the production of maize, which is the primary source of annual income for most farm households in our setting. They can choose to set aside maize for consumption, sell it immediately for cash, or store it for selling later. In the Post Harvest season, households have need for large and often lumpy expenditures, including to repay debt that has accumulated through the year and most importantly, school fees, which are usually due in January (a few months after harvest). In our sample, 90% of farmers have school aged children and they report spending 37% of their harvest income on school fees. Discretionary expenses for marriage ceremonies and other local events are also often made in this period. All together, approximately 43% of total households expenditures are incurred during the Post-Harvest phase. The next period is Planting, when farmers need to invest in farm inputs, which directly affect the following year's harvest. However, given the lag between when income is received and when farm investments are made, farming

households often find it challenging to channel funds towards this productive investment. Lastly, the Lean period prior to the next harvest is characterized by a substantial dip in consumption for both food and non-food items.

The pressure to share household resources with family and friends can further limit the reinvestment of profits, by acting like a tax on savings and wealth accumulation (Jakiela and Ozier, 2016; Chandrasekhar et al., 2018). Tight social networks that serve key economic functions are characteristic of rural communities in LMICs (Robinson, 2012), and can provide a system of support and insurance against sudden exogenous shocks. In our data, borrowing from friends is very common, with 20% of the sample having taken a loan from a friend, and over 50% reporting giving a money or maize "gift" to family or friends. However, there may also be a downside to these close social connections in rural communities: returns from profitable investments may be easily accessible by other household members who have less thrifty spending preferences, or by friends and relatives living nearby. This inability to protect individual or household earnings from the demands of relatives, often referred to as a kin tax, could influence the incentives for and success of attempts to reinvest returns into future profitable opportunities.[3]

If farmers had access to effective, protected, and discreet savings technologies, the mismatch between the timing of returns and timing of when those returns are needed would be less consequential, and demands by kin may be easier to avoid. However, in our setting, access to formal savings remains limited: two-thirds of the sample has no money saved in a formal savings account.[4] The two most prevalent forms of savings in our setting remain the most traditional, namely, cash and bags of maize. However, saving in cash runs the risk of theft and stored maize is less liquid and more prominent to kin. Many farmers therefore lack access to safe and protected vehicles in which to save returns and transfer them from

[3]For instance, Anderson and Baland (2002) find that the probability of a woman participating in a ROSCA has an inverse-U shaped relationship to her income share (or bargaining position) within the household, arguably due to these considerations.

[4]See Dupas and Robinson (2013a); Prina (2015); Suri and Jack (2016); Dupas et al. (2018); Karlan et al. (2014).

one period to the next.

Given the multiple constraints on household savings noted above, this study examines whether access to an improved savings technology can help convert short-run credit-enabled revenue increases into longer-run investment and consumption growth.

II.II Experimental design

Our sample is comprised of 1589 smallholder farmers in the Webuye and Matete counties of western Kenya (see Burke et al. (2019) for a greater description of the sample). The design overlaid two treatments: (1) an investment opportunity, in the form of a harvest-time storage loan, and (2) access to a savings product, in the form of a simple lockbox. The storage loan was offered in partnership with the organization One Acre Fund (OAF), a non-profit social enterprise that supplies financing and training to smallholder farmers. The product was cash loan provided at harvest.[5] To ensure that farmers took on a loan they were able to repay, the loan size was capped at an amount proportional to the number of maize bags the farmer had in storage at the time of loan disbursal. OAF did not take physical possession of these bags as collateral and there was no formal obligation to store the maize beyond the date of loan disbursal. The cash loans were structured similar to the in-kind loans that OAF had usually offered, with a flat interest rate of 10% and a flexible repayment structure.[6] As noted above, this loan can enable a productive investment, as it allows farmers to potentially earn high rates of return by storing and selling their maize in a timely manner.

The savings product offered to farmers was a lockbox, a simple metal box to which the farmer held the key. Lockboxes can encourage savings through three mechanisms. First, the lockbox is a safe place to store money, with cash less prone to theft compared to other at-home alternatives. Second, since participants are free to keep the box hidden, it can also help shield money from family and friends and thus reduce the magnitude of the kin

[5]Outside of OAF, access to formal credit was limited in our sample, with only 8% ever having taken out a formal bank loan. See Burke et al. (2019) for details.

[6]The only condition was that full repayment was due at the end of 10 months.

tax. Third, the product can also facilitate savings through a mental accounting effect, as it provides a soft form of commitment by allocating the savings to a specific use or labeling (Thaler, 1999; Dupas and Robinson, 2013b). Unlike some commitment accounts, a lockbox allows full flexibility in terms of withdrawal and usage (for the holder of the key), and unlike formal savings accounts can lower transaction or other costs (e.g., travel time to travel to the bank, or minimum account balances).

Farmers were first randomized into the loan product. Then, in an additional layer of randomization, farmers in each treatment group were randomized into receiving a lockbox or not. See Figure 1a for details on the experimental design. Because OAF operates in a farmer group model, the loan was introduced to randomly selected groups, which consisted of 8-12 farmers each, all of whom were assigned the same treatment. Randomization was stratified based on geographic sublocation and on whether the group average OAF loan size in the previous year was above or below the median. In Year 1, two-thirds of groups were offered a loan and one-third were not. In addition, in order to test the importance of loan timing, a random half of loan offers in Year 1 were made in October, immediately post-harvest, and the remainder were made in January, when school fees are typically due (in both cases, farmers were made aware of the timing of the forthcoming loan beforehand, in September.)

While all farmers in a particular group were assigned the same loan treatment, for research budget reasons only a random set of 6-8 farmers per group were followed up for survey data collection. Then, within these 6-8 farmers in the study sample, the savings lockboxes were randomized across farmers at the individual level, and this treatment was stratified by the group treatment assignment and gender. On average, 30% of farmers were offered the lockbox. Lockboxes were disbursed in November of Year 1.

In Year 2 of the study, the loan groups were re-randomized, with loan offers stratified based on sublocation and treatment status from Year 1. All loans for Year 2 were offered in November, as immediate-post harvest-time loans were seen to be more effective in Year 1

(Burke et al., 2019). Note that additional lockboxes were not provided in Year 2.

Taken together, in Year 1, the study included 240 farmer groups, for a total sample size of 1589 farmers. In Year 2, there was an attempt to follow all of the same groups, but several groups dissolved or merged, leaving 171 intact groups, and some farmers also re-shuffled among groups. As a result, the Year 2 sample contains 1019 farmers, with 602 farmers remaining from the Year 1 sample and 417 new randomly chosen farmers added from within these groups. Because the lockbox was only distributed at the start of Year 1, these 417 farmers new to the sample in Year 2 are not part of the lockbox experiment and are excluded from the analysis in this paper.

III Data and estimation

The study collected a baseline household survey before Year 1, three follow up rounds each year (Years 1 and 2), and a long-run follow-up (LRFU) survey one year after the completion of the last Year 2 survey round (see Figure 1b for the timeline). Three follow-up rounds were conducted in each year spanning the nine months after harvest, and were spread out across the post-harvest, planting and pre-harvest (lean) period. Surveys collected data on household information, farming practices, maize harvest and inventory, expenditures, consumption, household finances and transfers, non-farm income, time and risk preferences. The multiple follow-up rounds provide the high-frequency data necessary to document the role of credit and savings products in allowing inter-temporal movement of cash and investment, as well as measuring living standards via consumption expenditures.[7] The LRFU survey followed all 1019 farmers from the Year 2 sample and a representative subset of 481 farmers from the Year 1 sample.

Sample attrition was low, with over 90% follow-up for both years and no differential attrition across the treatment arms.[8] Appendix C presents balance in the characteristics of

[7]Collecting multiple follow up rounds of survey data also improved statistical power (see McKenzie (2012)).

[8]Farmers who received a loan in Year 1 were more likely to return to the study in Year two. However,

farmers in the Year 1 sample and the subset who continue into the Year 2 sample, for both the loan and the lockbox treatment groups, although we note some imbalances in covariates in the lockbox treatment in Year 1, which leads us to carry out a robustness check in Appendix C, as discussed below.

III.I Estimation of treatment effects

The study has four main outcome variables: net revenues from maize, total household consumption, farm investments, and school fees paid. Net revenues from maize are calculated by subtracting the amount spent purchasing maize from the revenues earned by selling maize. For farmers who received a loan, we also subtract the loan payments made each month. We refrain from calling this measure "profits from maize" as we do not measure all the costs associated with maize farming. Total (log) household consumption is aggregated from a detailed seven-day recall for food expenditure outside the home and 30-day recall for non-food expenditure. For farm investment, we calculate the amount spent on farm inputs in the planting season, including detailed data on the amount spent on hybrid seeds and chemical inputs such as fertilizers. We measure cash payments made towards school fees using a 30-day recall.

We begin by replicating the results in Burke et al. (2019), documenting the effect of the loan on net revenues, consumption, farm investments, and school fees. Equation 1 presents the primary econometric specification, which pools data across across survey rounds where such data is available.[9] Y_{ijrm} is the outcome variable of interest for farmer i in group j in round $r \in \{1, 2, 3\}$ in year $m \in \{1, 2\}$. $Loan_{im}$ is an indicator for whether farmer i was offered a loan in year m. The β coefficients capture the intention to treat (ITT) effects. We include round year fixed effects η_{rm} and control for the survey date d_t. We also control for stratification indicators γ_s as per Bruhn and McKenzie (2009). Standard errors are clustered

since loan treatment status was re-randomized in Year 2 and stratified based on Year 1 treatment status, it should not affect the internal validity of the Year 2 results.

[9]For farm investments, there is only data for the planting season, when such investments are made. For school fees, we focus on total school fees over the year and thus do not use the round by round data.

at the OAF farmer group level, the level of randomization for the loans. For all outcome variables, we present robustness to inclusion of baseline covariates as well as to winsorizing the dependent variable at 5% (see Appendix D).

$$Y_{ijrm} = \alpha + \beta_1 Loan_{im} + \eta_{rm} + d_t + \gamma_s + \varepsilon_{ijrm} \quad (1)$$

We then proceed to estimate the added effect of offering a lockbox. The main lockbox specification restricts the sample to those who received a loan, and estimates the additional effect of being offered a lockbox as follows:

$$Y_{ijrm} = \alpha + \phi_1 Lockbox_{im} + \eta_{rm} + d_t + \gamma_s + \varepsilon_{ijrm} \quad (2)$$

The definition of terms is as in Equation 1, where $Lockbox_{im}$ is the indicator for individual lockbox treatment assignment. To assess whether the gains from the lockbox were more pronounced when then combined with more profitable loans, we estimate Equation 2 by restricting the sample based on the timing of the loan.

Finally, we present the pooled specification as in Equation 3 showing the interaction between loan and lockbox treatments:

$$Y_{ijrm} = \alpha + \phi_1 Lockbox_{im} + \phi_2 Loan_{im} + \phi_3 Lockbox_{im} * Loan_{im} + \eta_{rm} + d_t + \gamma_s + \varepsilon_{ijrm} \quad (3)$$

IV Results

IV.I Take-up for loan and lockbox

Take-up of both the loan and lockbox treatments was quite high: loan take-up rates were 64% and 62% for Year 1 and 2, respectively, higher than is typical of many other credit interventions in LMICs (Karlan et al., 2010; Banerjee et al., 2015; Jack et al., 2016). Take-

up for the lockbox was 97% and, conditional on take-up, 78%, 63% and 50% of farmers report using the lockbox in Year 1, 2 and the LRFU, respectively (see Appendix B and Table B.1 for further descriptive statistics). This high usage rate is a first piece of evidence of the value households attached to this savings technology.

IV.II Treatment effects

As shown in Burke et al. (2019), the loan intervention had significant positive effects on the net revenues earned from maize (Table 1, Panel A, col. 1).[10] Compared to those who did not receive a loan, farmers who were offered a harvest time loan earned Ksh 533 higher net revenues from maize. As discussed in Burke et al. (2019), this was driven by farmers increasing maize purchases when prices were low (in the post-harvest season), holding more inventories of maize, and selling maize when prices were higher (in the planting and lean seasons). However, while the loan intervention increased revenues, it did not translate to a statistically significant increase in household consumption (although point estimates are positive), nor in farm investments or school fees (cols. 2-4).[11]

We next examine whether combining credit access with a savings technology enables farmers to gain more, either in terms of consumption or long-run productive investment. While the addition of access to a lockbox does not significantly affect farm revenues (1, Panel B, col. 1), we find that it does enable farmers to protect and safely move cash across seasons: access to a lockbox, conditional on receiving a loan, significantly increased household consumption (col. 2), leading to a 7% increase in average consumption across follow-up survey rounds. In Appendix E, we show that these consumption gains are driven by a 9% increase (significant at 5%) in consumption in the lean season, farming households' neediest period.

We also see evidence that the lockbox enabled farmers to invest gains from a one-time

[10] Appendix D provides robustness checks, estimating Equation 1 and 2 with baseline covariates and by winsorizing the dependent variable at 5%.

[11] Note that due to a minor coding error, results in Panel A Column 4 differ slightly from what is presented in Appendix Table E.4 in (Burke et al., 2019). This coding error only affected this outcome.

increase in revenues into future productive investments in their farm: farmers who receive a lockbox in addition to a loan increased on-farm investment by 11% compared to farmers who only received a loan.[12] Access to a lockbox, conditional on a loan, also results in a positive, albeit not significant, increase in school fee payments of 12% (col. 4).

IV.III Unpacking the timing of savings and consumption

While the above results pool data across survey rounds, we next study the impact of the lockbox on savings and consumption by round in order to unpack exactly how savings access facilitates greater welfare gains when households undertake productive investments. Figure 2 presents non-parametric estimates for the effects of the lockbox on household savings and consumption over time, conditional on being offered a loan. The left panel presents the mean household consumption for those with and without a lockbox, as well as average lockbox dis-savings for those with a lockbox. We see that farmers with access to a lockbox consume more through the entire year (a point to which we return below), and that this gap is particular pronounced during the lean season, (from June to August), as noted above. The right-hand panel, which shows the difference between treatment and control consumption over time for the lockbox treatment, along with the bootstrap-estimated 90% and 95% confidence interval, confirms that this gap in lean season consumption is significant at 95% confidence. The timing of these consumption gains is important for welfare, as the lean season is a time of particularly high farmer need in which the marginal utility of household consumption is presumably particularly high.

To understand what drives these differences in lean-season consumption, we return to the left-hand panel, on which we have overlaid the dis-savings for those with access to a lockbox. We define dis-savings as negative savings, such that a negative value implies that money was added to the lockbox, whereas, a positive value represents money being withdrawn from the lockbox. Note that the positive treatment effect on consumption coincides with the timing of

[12]The number of observations for farm investments is about one-third that for all other variables since this data was only collected in the planting season, as noted above.

dis-savings from the lockbox. While not dispositive, this does strongly suggest that farmers use the savings accumulated in the lockbox to fund lean-season consumption.

That said, the lockbox appears to work not solely through allowing farmers to move consumption across time. In contrast to a typical "consumption smoothing" mechanism, in which we would expect any increase in lean season consumption to be matched by dips in consumption in other seasons, instead we see that consumption is higher throughout the year. This suggests that a second mechanism may be at play, consistent with results from Jakiela and Ozier (2016) and Dupas and Robinson (2013b): specifically, the lockbox may enable households to shield some money from the kin tax imposed by family and friends. As noted above, in the study setting, the pressure to share money with friends and extended family is quite prevalent, and over 50% of the sample reports sharing maize or money with kin at baseline. Consistent with this, we also find that farmers who gave more money to friends and family than they received at baseline are significantly less likely to loan money to people in their social network when they have access to a lockbox (see Appendix F). Of course, the welfare implications of this reduction in kin tax are not obvious. While farmers who were offered the lockbox (in addition to the loan) are able to channel the returns from the loan into consumption and productive re-investments within their own household, it may have had adverse effects on their kin who relied on them for support and no longer received as much in the way of transfers or loans.

IV.IV Are the gains from the lockbox most pronounced among the most profitable loans?

In this section, we present additional evidence suggesting that findings we observe are the result of the interplay between access to a profitable investment and a savings technology, by documenting that the gains from the lockbox are most pronounced when combined with the most profitable loans.

In a setting marked by seasonality, the timing of the loan matters. Recall that in Year

1, the timing of the loan was randomized, with half of groups receiving the loan in October, immediately after harvest, and the other half receiving the loan in January. Burke et al. (2019) find that the October loan lead to significantly higher maize inventories, net revenues and household consumption – perhaps because farmers who received the loan in January had already liquidated their maize to meet post-harvest expenditure needs. The October loan thus appeared to open up more productive investments (in this case, greater or longer storage) than the January loan.

Here we analyze whether the lockbox is particularly useful for the October loan group, as one would expect if what the lockbox is doing is enabling better use of the returns from productive investments. We start by replicating the Burke et al. (2019) results in Table 2, Panel A, in which columns 2, 4, 6 and 8 compare farmers who were offered the loan in October of Year 1 to the control group, while columns 1, 3, 5 and 7 present treatment effects for the January loan treatment groups versus the control group. Being offered the October loan led to a significant increase in net revenue of 588 Ksh, while the average effect of the January loan in Year 1 led to a smaller (and not statistically significant) increase in net revenues. We next examine (Panel B) whether the gains from access to the lockbox savings technology are similarly concentrated among those who received the October loan. We find evidence that this is the case for consumption, farm investment and school fees (effects for for farm investments are not significant, perhaps because this outcome is only observed in one survey round and therefore estimated effects are less precise). Taken together, this provides considerable evidence that the savings technology is most impactful when household have greater returns from a productive investment in hand.

IV.V Complementarities between credit and savings

Table 1 suggests that the lockbox enables both consumption and investment. To identify whether these gains are simply the straightforward benefits of accessing savings technologies – which have been documented in the existing literature – or whether there are truly com-

plementary between savings and credit, we run the interaction specification as described by Equation 3.

Table 3 presents results. First, we see no significant positive effect from the lockbox alone on any outcomes, suggesting that the previous results are not simply the effect of accessing savings technologies on its own.[13,14] Rather, we see strong evidence of complementarities, as suggested by the significant interaction term on consumption and school fees (and a positive, albeit not significant effect on farm investment). Point estimates suggest a 14% increase in household consumption, a 445 Ksh increase in farm investment, and a 1251 Ksh increase in school fee investments when farmers receive both the loan and the lockbox. Taken together, these patterns suggest that there are meaningful complementarities between the credit and savings products.

V Conclusion

This study examines whether access to an improved savings technology can help convert short-run, credit-enabled revenue increases into longer-run investment and consumption growth. We find that providing a savings lockbox, conditional on being offered a loan, helps farmers undertake expenditures that are incurred with a lag after harvest: farmers increase household consumption by 7%, an increase which is driven by improved consumption in the lean season. Farmers are also able to increase productive investments on the farm by 11%. These gains are not observed when farmers are offered a lockbox or loan alone.

How do saving technologies allow farmers to channel returns from short-term productive investments into longer-run consumption gains and reinvestment in future production? We identify two mechanisms: first, savings products allow households to move funds intertem-

[13]For reasons that are unclear, impacts on school fees paid are surprisingly negative, but are only marginally significant (col. 4).

[14]This is in contrast to Dupas and Robinson (2013b), who estimate large positive effects for households of being provided with a lockbox alone. While Dupas and Robinson (2013b) also takes place in western Kenya, our population with OAF is focused on farm households. Perhaps it is due to our agricultural household-heavy sample that we do not see positive and significant effects for the lockbox alone.

porally, bridging any gap between when the initial investment yields returns and when consumption or reinvestment is needed. Second, savings technologies can enable households to shield returns from kin tax, leaving more funds for personal consumption and reinvestment.

The results highlight the inter-linkages between financial products, and provide one potential explanation for the often disappointing performance of existing microcredit interventions (Banerjee et al., 2015). The findings of this paper also have important policy implications, suggesting that a more integrated microfinance approach that provides households with complementary credit and savings products could be more effective at meaningfully raising household living standards in low- and middle-income countries.

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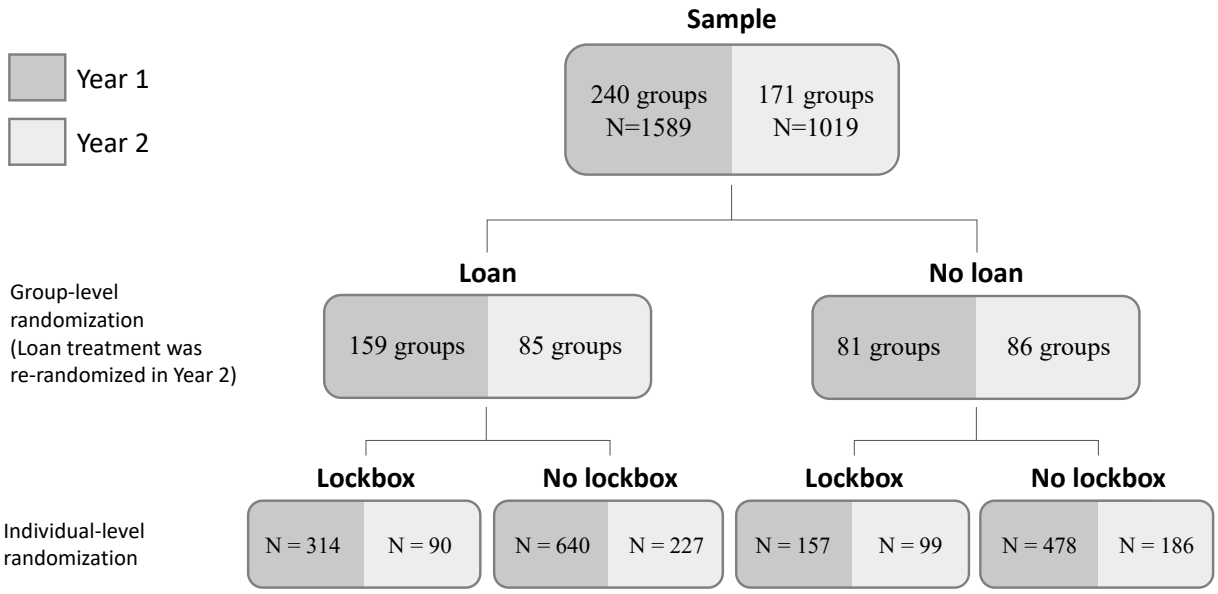
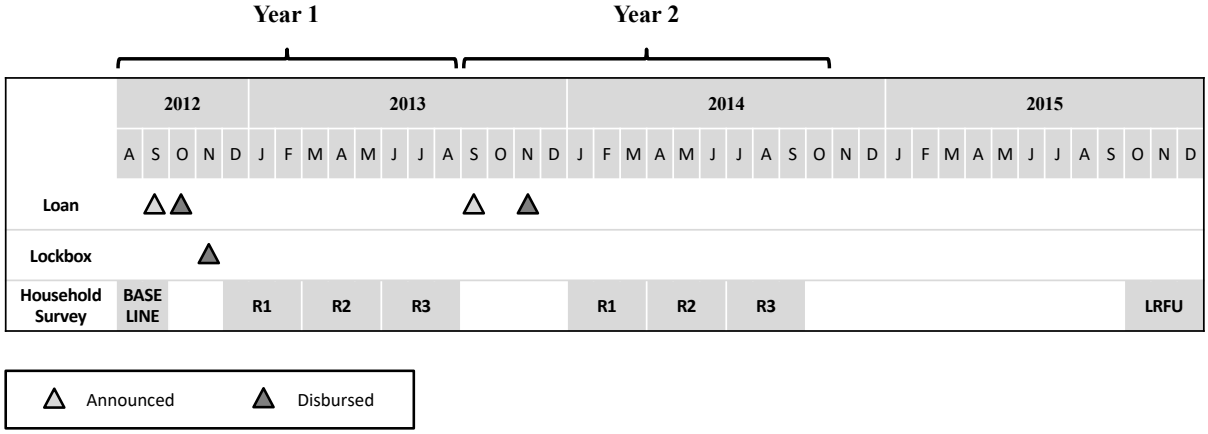
Tables and Figures

Figure 1: **Experimental design**



(a) **Study design**: There were two levels of randomization in year one- a loan and lockbox treatment. The loan treatment was randomized at the group level. The lockbox treatment was randomized at the individual level. In Year 2, the loan treatment was re-randomized. The lockbox treatment was not re-randomized in year two, but we follow a sub sample of year one individuals who participated in year two. Numbers of randomized units are given in the boxes.



(b) **Study timeline**: This figure depicts the harvest periods, timing of interventions and the survey waves.[a]

[a]R1, R2 and R3 and LRFU indicate the three survey rounds and the the long run follow-up.

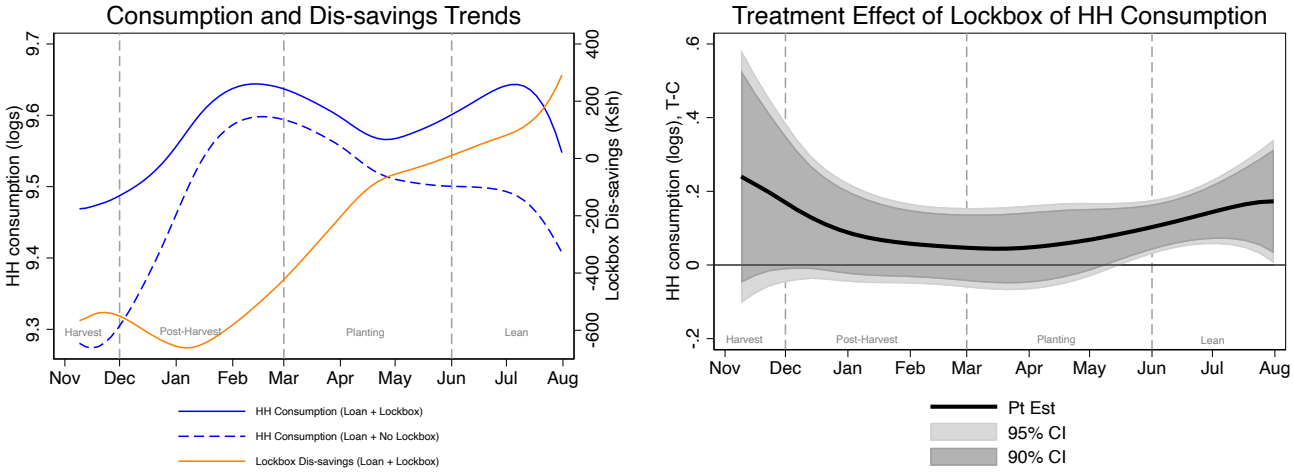
Table 1: **Treatment effects** :The dependent variables are Net Revenues, Total HH consumption, Farm Investment and School Fees. Net revenues are measured by the value (in Ksh) of maize sales minus the value of maize purchases that round. The exchange rate during the study period ranged from 80 to 90Kenyan shillings per USD. TotalHH consumption is the log of HH consumption (measured in logged Ksh), aggregated from a detailed 30 day recall consumption module. Farm Investment is the value (in Ksh) of hybrid seeds, DAP (fertilizer), and CAN (fertilizer) used on maize plots in the season following the loan disbursal (because the Year 2 survey only measured the quantities used, average prices from Year 1 are used to get values in Year 2). This variable was only measured in round three for each year, as that is when farmers undertake this investment. School Fees are the expenditures on school fees over the past month (in Ksh). "Lockbox" is an indicator for being in the lockbox treatment group. Panel A shows the treatment effect of the loan treatment. Panel B shows the treatment effect of the lockbox, conditional on being offered the loan treatment. The results are pooled for year one and two of the study. Regressions include round-year fixed effects, strata dummies, and controls for survey date, with errors clustered at the group level. "Mean DV" and "SD DV" are the mean and standard deviation of the dependent variable among the control group.

	(1) Net Revenues	(2) Total HH Consumption	(3) Farm Investments	(4) School Fees
Panel A: Treatment effect of Loan				
Loan	533.44***	0.04	-69.84	3.85
	(195.49)	(0.02)	(155.90)	(244.86)
Observations	6730	6736	2276	6787
Mean DV	-1616.12	9.55	5332.46	3911.31
SD DV	6359.06	0.64	3596.71	8281.46
R squared	0.12	0.06	0.15	0.06
Panel B: Treatment effect of Lockbox, conditional on Loan				
Lockbox	175.60	0.07**	496.03**	418.45
	(237.98)	(0.03)	(223.13)	(310.71)
Observations	3436	3443	1172	3473
Mean DV	-358.80	9.52	4549.72	3400.94
SD DV	6503.00	0.64	3587.37	7455.92
R squared	0.10	0.07	0.18	0.10

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Figure 2: **Time trends for HH consumption and Lockbox Dis-savings**



Notes: The left panel shows how average log household consumption and lockbox savings evolve from November to August in Y1 and Y2 (pooled), as estimated with fan regressions. HH consumption (measured in logged Ksh) is aggregated from a detailed 30 day recall consumption module. Lockbox dis-savings is measured as the change in the amount saved in the box at the time of the survey. A positive dis-savings implies a decrease in the amount of savings. The exchange rate during the study period ranged from 80 to 90 Kenyan shillings per USD. The right panels show the difference in treatment minus control over time for the lockbox treatment, with a 90% and 95% confidence interval. This is estimated by bootstrapping a fan regression 1000 times, without replacement.

Table 2: **Treatment effects by loan timing** :The dependent variables are Net Revenues, Total HH consumption, Farm Investment and School Fees. Net revenues are measured by the value (in Ksh) of maize sales minus the value of maize purchases that round. The exchange rate during the study period ranged from 80 to 90Kenyan shillings per USD. TotalHH consumption is the log of HH consumption (measured in logged Ksh), aggregated from a detailed 30 day recall consumption module. Farm Investment is the value (in Ksh) of hybrid seeds, DAP (fertilizer), and CAN (fertilizer) used on maize plots in the season following the loan disbursal (because the Year 2 survey only measured the quantities used, average prices from Year 1 are used to get values in Year 2). This variable was only measured in round three for each year, as that is when farmers undertake this investment. School Fees are the expenditures on school fees over the past month (in Ksh). "Lockbox" is an indicator for being in the lockbox treatment group. Panel A shows the treatment effect of the loan treatment. Panel B shows the treatment effect of the lockbox, conditional on being offered the loan treatment. Columns 1,3,5 and 7 shows the treatment effects for October and January loans of the Y1 treatment. Columns 2,4,6, and 8 show the treatment effects for the October loan. The results are pooled for year one and two of the study. Regressions include round-year fixed effects, strata dummies, and controls for survey date, with errors clustered at the group level. "Mean DV" and "SD DV" are the mean and standard deviation of the dependent variable among the control group.

	Net Revenues		Total HH Consumption		Farm Investment		School Fees	
	(1) Oct	(2) Jan	(3) Oct	(4) Jan	(5) Oct	(6) Jan	(7) Oct	(8) Jan
Panel A: Treatment effect of Loan (Oct and Jan)								
Loan	587.81**	-41.21	0.03	0.00	-219.55	-273.09	-310.36	-234.95
	(286.31)	(297.98)	(0.04)	(0.03)	(245.20)	(214.61)	(299.00)	(296.60)
Observations	2534	2536	2535	2534	867	869	2572	2571
Mean DV	-1616.12	-1616.12	9.55	9.55	5332.46	5332.46	3911.31	3911.31
SD DV	6359.06	6359.06	0.64	0.64	3596.71	3596.71	8281.46	8281.46
R squared	0.04	0.04	0.04	0.04	0.08	0.07	0.06	0.06
Panel B: Treatment effect of Lockbox, conditional on Loan (Oct and Jan)								
Lockbox	258.66	33.26	0.10**	0.04	584.08	576.38	1132.37***	-462.69
	(341.56)	(415.86)	(0.05)	(0.05)	(389.94)	(366.27)	(417.79)	(421.42)
Observations	1259	1261	1258	1257	430	432	1272	1271
Mean DV	708.05	284.57	9.45	9.47	3715.63	3823.85	2614.39	3207.12
SD DV	6227.68	6197.31	0.62	0.63	3225.57	3194.25	5947.33	7063.82
R squared	0.05	0.06	0.05	0.05	0.12	0.13	0.10	0.08

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: **Interaction of the Loan and Lockbox treatment** :The dependent variables are Net Revenues, Total HH consumption, Farm Investment and School Fees. Net revenues are measured by the value (in Ksh) of maize sales minus the value of maize purchases that round. The exchange rate during the study period ranged from 80 to 90Kenyan shillings per USD. Total HH consumption is the log of HH consumption (measured in logged Ksh), aggregated from a detailed 30 day recall consumption module. Farm Investment is the value (in Ksh) of hybrid seeds, DAP (fertilizer), and CAN (fertilizer) used on maize plots in the season following the loan disbursal (because the Year 2 survey only measured the quantities used, average prices from Year 1 are used to get values in Year 2). This variable was only measured in round three for each year, as that is when farmers undertake this investment. School Fees are the expenditures on school fees over the past month (in Ksh). "Lockbox" is an indicator for being in the lockbox treatment group. Panel A shows the treatment effect of the loan treatment. Panel B shows the treatment effect of the lockbox, conditional on being offered the loan treatment. The results are pooled for year one and two of the study. Regressions include round-year fixed effects, strata dummies, and controls for survey date, with errors clustered at the group level. "Mean DV" and "SD DV" are the mean and standard deviation of the dependent variable among the control group.

	(1)	(2)	(3)	(4)
	Net Revenues	Total HH Consumption	Farm Investment	School Fees
Lockbox	-169.95	-0.06	36.69	-776.20*
	(321.48)	(0.04)	(294.89)	(439.50)
Loan	342.25	-0.02	-175.35	-493.04
	(245.88)	(0.03)	(205.62)	(304.95)
Lockbox*Loan	428.87	0.14***	445.00	1251.03**
	(402.80)	(0.05)	(367.49)	(537.57)
Observations	5534	5546	1885	5595
Mean DV	-1616.12	9.55	5332.46	3911.31
R squared	0.11	0.06	0.15	0.07

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Supplementary Appendix

Table of Contents

A Setting

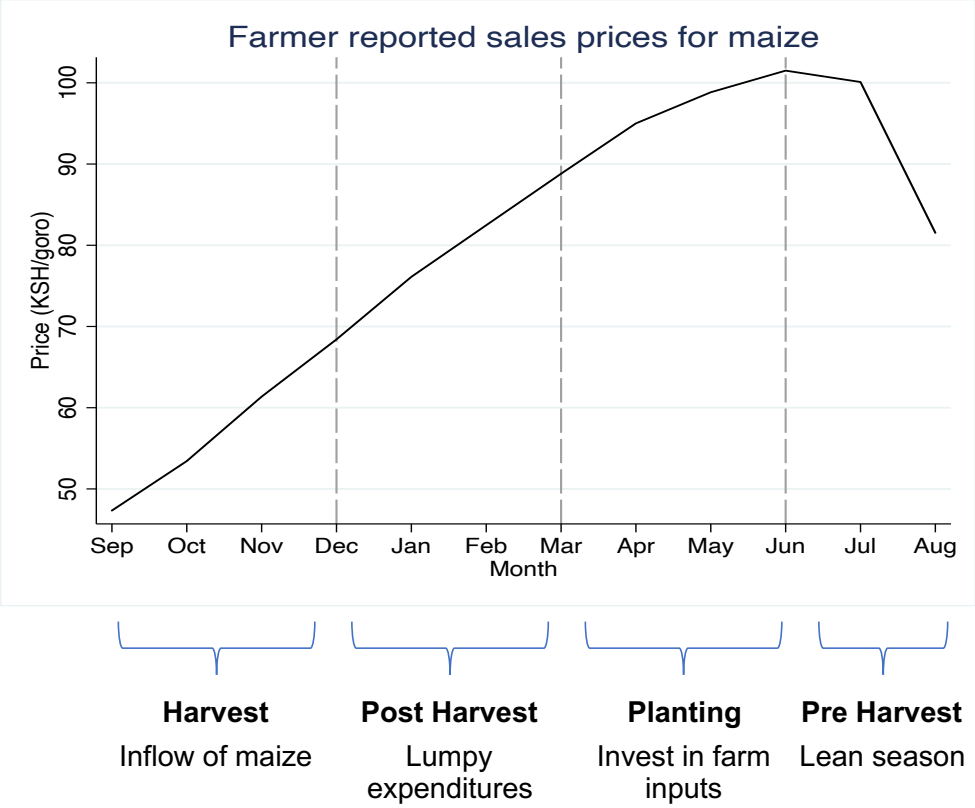


Figure A.1: **Seasonal price trends in maize markets**. Farmer-reported average monthly maize prices for the period 2007-2012, averaged over all farmers in our sample. Prices are in Kenyan shillings per goro (2.2kg). We also show the corresponding periods or seasons in our setting.

B Take-up and Use

In year one, 954 farmers were offered a loan and 617 applied and qualified for it. In year two, of the 522 farmers were offered a loan, 324 took up the loan. Take up rates of 64% and 62% for year one and two respectively, is quite high relative to similar credit interventions in low income countries. Karlan et al. (2010) find that take up rates range from 2-55% in similar settings. We think our take up rates are on the higher side because, participants in our study knew and trusted OAF from previous engagement with the NGO for other services. The unconditional loan size for the year one loan treatment was 4,817 Ksh (or $ 57). Conditional on take up the average loan size was 7,533 Ksh ((or $ 89). Similarly, for

year two the unconditional loan size was 6,679 Ksh (or $ 79) and the conditional loan size was 10,548 Ksh (or $ 124). The loans were approximately 43% of harvest value, calculated based on harvest time prices. 24% of the farmers opt to take the maximum loan size possible. Default rates were below 2%.

Table B.1: **Descriptive statistics on take-up and use**

	Year 1	**Year 2**	**Long run**
Panel A : Lockbox			
Take up	0.97		
Still has lockbox		0.89	0.51
Uses lockbox [15]	0.78	0.63	0.50
If uses, current balance (in Ksh)			
Mean	683	360	339
Median	400	200	100
SD	798	375	451
Mean number of additions (in a week)	1	1	2
Mean number of withdrawals (in a week)	1	1	1
Panel B : Loan			
Take-up	0.64	0.62	
Average loan size (in Ksh)			
Unconditional	4817	6679	
Conditional on take-up	7533	10,548	

Notes: Data on balances in the lockbox are self-reported. Enumerators were asked to verify the amount by looking into the lockbox, if the participant was willing. The data on balances and withdrawals were also self reported. They were double checked using the inventory sheet, which the participants were encouraged to maintain. The exchange rate during the study period ranged from 80 to 90 Kenyan shillings per US$.

Take up rates for the lockboxes were as high as 97% when it was offered in year 1. Conditional on take-up 78% farmers use the lockbox and save an average of 683 Ksh (or $ 8). In year two, 89% of farmers reported that they still had the lockbox. Conditional on having the lockbox, 63% used it and saved an average of 360 Ksh (or $ 4) respectively. On average farmers add or withdraw from the lockbox once a week in year one and two. In

[15] Uses Lockbox = 1 if there is a non zero amount in the box or money has been added or withdrawn from it in the last week. This metric is conditional on taking up/ still having the box.

the long run follow-up, three years after the lockbox was offered, 51% farmers still had the lockbox. Conditional on having the box, 50% report using it. The average amount saved was 339 Ksh (or $ 3). Farmers added to the lockbox twice a week and withdrew from it once a week, on average. Figure B.1 shows the savings amounts in the lockbox over time, pooled for year one and year two. We see that savings are accumulated in the lockbox post harvest, maintained through the planting season and partially used in the lean season. [16]

Figure B.1 shows that farmers consistently save in the lockbox during the study period. We see that farmers who received a loan have higher savings in the lockbox.

Table B.2 presents the treatment effect on total savings, by estimating Equation 1 and 2. We find that access to a loan does not have significant effects on household savings. We next examine whether combining credit access with a savings technology enables farmers to save more. Conditional on getting the loan, we see that farmers who were offered a lockbox show a 53% increase in total household savings, which is significant at the 5% level. Thus, farmers who were less cash constrained at harvest were able to use a lockbox to significantly increase savings.This increase in total household savings is a first piece of evidence of the value households attached to this savings technology. This implies that easing both credit and savings constraints simultaneously, can help the poor accumulate savings. Though we see that access to a lockbox decreases the total savings outside of a lockbox, this effect is statistically indistinguishable from zero. Thus, it is possible that farmers who received a lockbox move some of their savings from alternate savings devices to their lockbox, but we do not find any evidence of significant crowding out of savings.

[16] In a similar setting in Kenya, Dupas and Robinson (2013b) note that 74% (71%) of participants use the safe box six (twelve months) after it was offered to them. Among those who use the safe box, average balances were 634 Ksh ($ 8.4) after six months and 311 Ksh ($ 4.1) after 12 months. Thus, descriptive statistics around take-up and usage are quite similar to our study

Table B.2: **Treatment effect on Savings**: Data on savings was only collected in in the Year 1 - round 3 survey. Total Savings is the log of Total HH savings (measured in logged Ksh), at the time of the survey. It includes the amount saved in a bank account, ROSCA, SACCO, mobile money and the lockbox. Savings (excl. Lockbox) measures the log of total savings in all savings devices excluding the lockbox."Lockbox" is an indicator for being in the lockbox treatment group. The first two columns, show results for the Loan group and the last two columns show the results for the No Loan group. Regressions include strata dummies, and controls for survey date, with errors clustered at the group level. "Mean DV" and "SD DV" are the mean and standard deviation of the dependent variable among the control group.

	(1) Total Savings	(2) Savings (excl. Lockbox)
Panel A: Treatment effect of Loan		
Loan	-0.01	-0.10
	(0.21)	(0.22)
Observations	1299	1299
Mean DV	6.88	6.73
SD DV	3.10	3.18
R squared	0.07	0.07
Panel B: Treatment effect of Lockbox, conditional on Loan		
Lockbox	0.53**	-0.20
	(0.26)	(0.27)
Observations	862	862
Mean DV	6.63	6.63
SD DV	3.40	3.40
R squared	0.09	0.09

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

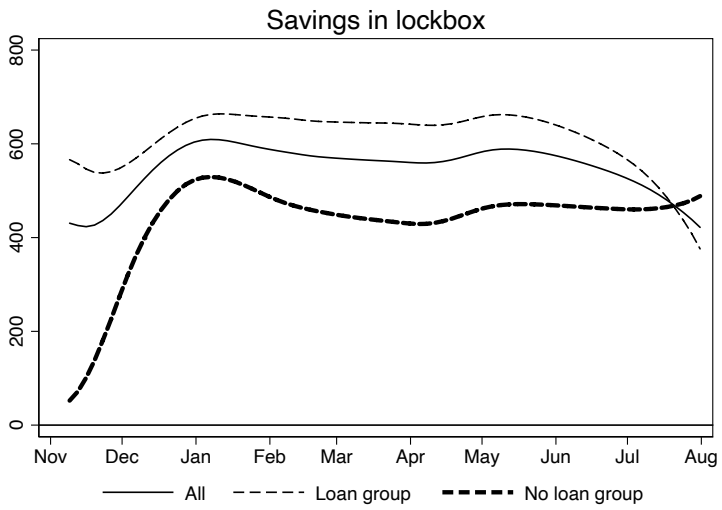


Figure B.1: **Savings in lockbox over time** Amount saved in the lockbox at the time of the survey. The data is pooled across Year 1 and Year 2 of the study.

C Summary Statistics and Balance Tables

In this section, we first present balance tables for year 1 of the study. [17]Table C.1 Columns 2-5 and Columns 6-9 present balance checks for the loan and lockbox treatment respectively, conditional on the loan. For the loan treatment, we observe balance. For the lockbox treatment (conditional on loan) we observe balance on most baseline variables at the 1% and 5%, but at the 10% level we have more than expected variables that are not balanced. We present a robustness check for this in Table C.2. We present the average impact of our treatments by estimating Equation 2 controlling for all baseline variables that are not balanced at 10%. Our results are robust for Farm investments. For Total HH consumption, the magnitude remains positive, but is not significant. As the main mechanism for the consumption effect, is the increase in household consumption in the lean season. We estimate Equation 2 including controls for imbalanced variables and present the results in Table C.3. We see that the treatment effect for round 3 (or the Lean season) remains robust. We find a 8% increase in lean season consumption (significant at 10%).

[17]For the loan treatment, the Year 2 study was designed to follow the sample of farmers we studies in Year 1. Due to administrative issues, farmer group compositions changed in Year 2. As a result, 417 of the 1019 farmers in year two were new to the sample. We did not collect baseline data for these farmers.

Table C.1: **Summary statistics**

Baseline characteristic	Loan					Lockbox, conditional on Loan				
			(T-C)					(T-C)		
	obs	*C mean*	*std*	*diff*	*p-val*	*obs*	*C mean*	*std*	*diff*	*p-val*
Male	1,589	0.33	-0.08	0.11		954	0.30	-0.02	0.78	
Number of adults	1,510	3.20	-0.09	0.06		903	2.96	0.07	0.34	
Children in school	1,589	3.07	-0.04	0.46		954	2.96	0.06	0.35	
Finished primary school	1,490	0.77	-0.13	0.02		890	0.73	-0.05	0.49	
Finished secondary school	1,490	0.27	-0.04	0.46		890	0.25	-0.01	0.86	
Total cropland (acres)	1,512	2.40	0.01	0.79		906	2.38	0.07	0.37	
Number of rooms in household	1,511	3.25	-0.05	0.17		904	3.06	0.02	0.75	
Total school fees	1,589	29,814	-0.06	0.18		954	25,332	0.18	0.02	
Avg consumption (Ksh)	1,437	15,371	-0.03	0.55		858	15,080	-0.02	0.72	
Avg consumption/capita (log)	1,434	7.96	0.02	0.72		855	7.98	-0.03	0.68	
Total cash savings (Ksh)	1,572	8,021	-0.09	0.01		943	4,537	0.15	0.07	
Total cash savings (trim)	1,572	5,390	-0.05	0.33		943	4,227	0.15	0.07	
Has bank savings acct	1,589	0.43	-0.01	0.82		954	0.39	0.18	0.01	
Taken bank loan	1,589	0.08	-0.02	0.73		954	0.07	0.06	0.40	
Taken informal loan	1,589	0.25	-0.01	0.84		954	0.24	0.06	0.39	
Liquid wealth (Ksh)	1,491	97,281	-0.03	0.55		893	89,704	0.14	0.09	
Off-farm wages (Ksh)	1,589	3,797	0.01	0.85		954	3,447	0.15	0.07	
Business profit (Ksh)	1,589	1,802	0.08	0.32		954	2,481	-0.04	0.50	
Avg %Δ price Sep-Jun	1,504	133	0.00	0.94		900	134	-0.00	0.99	
Expect %Δ price Sep12-Jun13	1,510	117	0.14	0.15		905	129	-0.09	0.15	
2011 LR harvest (bags)	1,511	9.03	0.02	0.67		905	9.37	-0.00	0.98	
Net revenue 2011 (Ksh)	1,428	-4,089	0.03	0.75		857	-1,970	-0.06	0.32	
Net seller 2011	1,428	0.30	0.05	0.39		857	0.32	0.02	0.81	
Autarkic 2011	1,589	0.06	0.03	0.51		954	0.08	-0.11	0.08	
% maize lost 2011	1,428	0.01	0.03	0.57		850	0.02	-0.12	0.06	
2012 LR harvest (bags)	1,484	11.03	0.02	0.74		890	11.13	0.02	0.81	
Calculated interest correctly	1,580	0.73	-0.03	0.50		950	0.70	0.09	0.21	
Digit span recall	1,504	4.58	-0.01	0.89		900	4.56	0.02	0.80	
Maize giver	1,589	0.26	-0.00	0.99		954	0.25	0.09	0.21	

Notes: Balance table for the Y1 study (restricted to the Y1 sample, for which we have baseline characteristics.)
"Total school fees" are the total school fees paid by the household in the past 12 months. "Avg. consumption (Ksh)" and "Avg. consumption/capita (log)" are calculated using monthly consumption numbers. Taken bank loan" is whether anyone in the household taken any loans from a commercial bank or commercial lender in the past 12 months. 'Taken informal loan" is whether anyone in the household taken any loans from a moneylender or someone else outside the household in the past 12 months."Liquid wealth" is the sum of cash savings and assets that could be easily sold (e.g. livestock). "Off-farm wages" is the total amount earned by anyone in the household who worked in a job for cash in the past month. "Business profits" are the total profits earned from all business run by anyone in the household. "Avg %Δ price Sep-Jun" is the percentage difference between the (self-reported) average market price for maize in September and June over the past five years. "Net revenue," "net seller," and "autarkic" refer to the household's maize marketing position. "Maize giver" is whether the household reported giving away more maize in gifts than it received over the previous 3 months.

Table C.2: **Balance - Treatment effect of Lockbox, conditional on Loan** The dependent variables are Net Revenues, Total HH consumption, Farm Investment and School Fees. Net revenues are measured by the value (in Ksh) of maize sales minus the value of maize purchases that round. The exchange rate during the study period ranged from 80 to 90Kenyan shillings per USD. Total HH consumption is the log of HH consumption (measured in logged Ksh), aggregated from a detailed 30 day recall consumption module. Farm Investment is the value (in Ksh) of hybrid seeds, DAP (fertilizer), and CAN (fertilizer) used on maize plots in the season following the loan disbursal (because the Year 2 survey only measured the quantities used, average prices from Year 1 are used to get values in Year 2). This variable was only measured in round three for each year, as that is when farmers undertake this investment. School Fees are the expenditures on school fees over the past month (in Ksh). "Lockbox" is an indicator for being in the lockbox treatment group. Panel A shows the treatment effect of the loan treatment. Panel B shows the treatment effect of the lockbox, conditional on being offered the loan treatment. The results are pooled for year one and two of the study. Regressions include round-year fixed effects, strata dummies, controls for survey date, with errors clustered at the group level, and all baseline variables that are not balanced at 10%. "Mean DV" and "SD DV" are the mean and standard deviation of the dependent variable among the control group.

	(1)	(2)	(3)	(4)
	Net Revenues	Total HH Consumption	Farm Investments	School Fees
Lockbox	105.33	0.02	467.00*	-41.78
	(284.80)	(0.03)	(260.19)	(312.97)
School fees, KSH	13.65***	0.00***	19.15***	43.20***
	(4.84)	(0.00)	(3.79)	(5.93)
Has bank savings acct	825.29***	0.18***	741.73***	800.86***
	(283.44)	(0.03)	(266.18)	(268.70)
Total cash savings (KSH)	0.03*	0.00	0.02*	-0.00
	(0.02)	(0.00)	(0.01)	(0.01)
Off-farm wages (Ksh)	0.01	0.00**	0.01	0.01
	(0.01)	(0.00)	(0.01)	(0.01)
Autarkic 2011	329.71	0.07	387.02	382.46
	(547.25)	(0.06)	(390.24)	(521.06)
% maize lost 2011	617.19	-0.15	-602.60	470.33
	(1601.43)	(0.17)	(870.91)	(1786.41)
Observations	2334	2329	799	2354
Mean DV	-358.80	9.52	4549.72	3400.94
SD DV	6503.00	0.64	3587.37	7455.92
R squared	0.06	0.16	0.18	0.12

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table C.3: **Balance - Treatment effect of Lockbox, conditional on Loan** The dependent variable is Total HH consumption. Total HH consumption is the log of HH consumption (measured in logged Ksh), aggregated from a detailed 30 day recall consumption module. Columnn 1 presents results pooled across all rounds, while Column 2 presents results by round. "Lockbox" is an indicator for being in the lockbox treatment group. Panel A shows the treatment effect of the loan treatment. Panel B shows the treatment effect of the lockbox, conditional on being offered the loan treatment. The results are pooled for year one and two of the study. Regressions include round-year fixed effects, strata dummies, controls for survey date, with errors clustered at the group level, and all baseline variables that are not balanced at 10%. "Mean DV" and "SD DV" are the mean and standard deviation of the dependent variable among the control group.

	(1) Overall	(2) By round
Lockbox	0.02	
	(0.03)	
School fees, KSH	0.00***	0.00***
	(0.00)	(0.00)
Has bank savings acct	0.18***	0.18***
	(0.03)	(0.03)
Total cash savings (KSH)	0.00	0.00
	(0.00)	(0.00)
Off-farm wages (Ksh)	0.00**	0.00**
	(0.00)	(0.00)
Autarkic 2011	0.07	0.07
	(0.06)	(0.06)
% maize lost 2011	-0.15	-0.15
	(0.17)	(0.17)
Lockbox - R1		-0.03
		(0.05)
Lockbox - R2		-0.00
		(0.04)
Lockbox - R3		0.08*
		(0.05)
Observations	2329	2329
Mean DV	9.52	9.52
SD DV	0.64	0.64
R squared	0.16	0.16

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

D Robustness checks

In this section we check robustness of treatment effects to including baseline controls and winsorizing the dependent variable at 5%.

Table D.1 provides robustness checks for Table 1. Columns 1 to 2 present the results for Net revenues from maize, Columns 3 to 4 present the results for Total household consumption, Columns 5 to 6 present the results for Farm investments and Columns 7 to 8 present School fees results. Regressions with baseline controls and winsorization of the dependent variable are shown in columns 1, 3, 5 and 7 in both tables and regressions with winsorization of the dependent variable are shown in columns 2,4,6 and 8. The number of observations, the mean and standard deviation of the dependent variable for the control group, as well as the R- squared of the regression is presented in each column of the table. We present short run results by pooling year one and two of the study. We see from Table D.1 that our results are robust to including baseline controls and winsorizing the dependent variable at 5%.

In Tables D.2 and D.3 we check for robustness of results in Table 2. We show that the results are robust to including baseline controls and winsorizing the dependent variable (at 5%). Further, with the inclusion of controls, the effect of the lockbox on farm investments is statistically significantly larger for the October loan group. In summary, we see that farmers earn a much higher return (higher net revenues) to the October loan in comparison to the January loan. This provides evidence that the savings technology is most impactful when household have greater returns from a productive investment in hand.

Lastly, Table D.4 provides robustness checks for Table 3. Regressions with baseline controls are shown in columns 1, 3, 5 and 7 in both tables and regressions with winsorization of the dependent variable (at 5%) are shown in columns 2,4,6 and 8. On including baseline controls the direction and magnitude of treatment effects are in line with Table 3, but they are not significant. Our results are robust to winsorizing the dependent variable.

Table D.1: **Treatment effects** :The dependent variables are Net Revenues, Total HH consumption, Farm Investment and School Fees. Net revenues are measured by the value (in Ksh) of maize sales minus the value of maize purchases that round. The exchange rate during the study period ranged from 80 to 90Kenyan shillings per USD. TotalHH consumption is the log of HH consumption (measured in logged Ksh), aggregated from a detailed 30 day recall consumption module. Farm Investment is the value (in Ksh) of hybrid seeds, DAP (fertilizer), and CAN (fertilizer) used on maize plots in the season following the loan disbursal (because the Year 2 survey only measured the quantities used, average prices from Year 1 are used to get values in Year 2). This variable was only measured in round three for each year, as that is when farmers undertake this investment. School Fees are the expenditures on school fees over the past month (in Ksh). "Lockbox" is an indicator for being in the lockbox treatment group. Panel A shows the treatment effect of the loan treatment. Panel B shows the treatment effect of the lockbox, conditional on being offered the loan treatment. The results are pooled for year one and two of the study. Regressions include round-year fixed effects, strata dummies, and controls for survey date, with errors clustered at the group level. "Mean DV" and "SD DV" are the mean and standard deviation of the dependent variable among the control group.

	Net Revenues		Total HH Consumption		Farm Investments		School Fees	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Treatment effect of Loan								
Loan	465.82**	473.70***	0.03	0.03	-38.19	-73.23	-24.99	51.76
	(187.02)	(158.52)	(0.02)	(0.02)	(163.90)	(138.83)	(244.26)	(170.53)
Observations	5533	6730	5307	6736	1906	2276	5649	6787
Mean DV	-1616.12	-1616.12	9.55	9.55	5332.46	5332.46	3911.31	3911.31
SD DV	6359.06	6359.06	0.64	0.64	3596.71	3596.71	8281.46	8281.46
R squared	0.17	0.14	0.18	0.05	0.24	0.16	0.13	0.07
Panel B: Treatment effect of Lockbox, conditional on Loan								
Lockbox	91.69	116.15	0.05*	0.06**	456.38**	514.60**	131.42	371.78*
	(216.04)	(191.24)	(0.03)	(0.03)	(213.59)	(204.62)	(305.90)	(217.88)
Observations	3421	3436	3236	3443	1172	1172	3473	3473
Mean DV	-358.80	-358.80	9.52	9.52	4549.72	4549.72	3400.94	3400.94
SD DV	6503.00	6503.00	0.64	0.64	3587.37	3587.37	7455.92	7455.92
R squared	0.17	0.10	0.18	0.07	0.28	0.19	0.15	0.09
Baseline controls included	Yes	No	Yes	No	Yes	No	Yes	No
Dep. var. winsorized (5%)	No	Yes	No	Yes	No	Yes	No	Yes

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table D.2: **Treatment effects by loan timing (with baseline controls)** :The dependent variables are Net Revenues, Total HH consumption, Farm Investment and School Fees. Net revenues are measured by the value (in Ksh) of maize sales minus the value of maize purchases that round. The exchange rate during the study period ranged from 80 to 90Kenyan shillings per USD. TotalHH consumption is the log of HH consumption (measured in logged Ksh), aggregated from a detailed 30 day recall consumption module. Farm Investment is the value (in Ksh) of hybrid seeds, DAP (fertilizer), and CAN (fertilizer) used on maize plots in the season following the loan disbursal (because the Year 2 survey only measured the quantities used, average prices from Year 1 are used to get values in Year 2). This variable was only measured in round three for each year, as that is when farmers undertake this investment. School Fees are the expenditures on school fees over the past month (in Ksh). "Lockbox" is an indicator for being in the lockbox treatment group. Panel A shows the treatment effect of the loan treatment. Panel B shows the treatment effect of the lockbox, conditional on being offered the loan treatment. Columns 1,3,5 and 7 shows the treatment effects for October and January loans of the Y1 treatment. Columns 2,4,6, and 8 show the treatment effects for the October loan. The results are pooled for year one and two of the study. Regressions include baseline controls, round-year fixed effects, strata dummies, and controls for survey date, with errors clustered at the group level. "Mean DV" and "SD DV" are the mean and standard deviation of the dependent variable among the control group.

	Net Revenues		Total HH Consumption		Farm Investment		School Fees	
	(1) Oct	(2) Jan	(3) Oct	(4) Jan	(5) Oct	(6) Jan	(7) Oct	(8) Jan
Panel A: Treatment effect of Loan (Oct and Jan)								
Loan	555.23**	34.57	0.03	0.00	-204.19	-219.90	-231.91	-101.26
	(250.25)	(245.12)	(0.03)	(0.03)	(228.84)	(217.62)	(286.80)	(287.14)
Observations	2520	2518	2414	2420	867	869	2572	2571
Mean DV	-1616.12	-1616.12	9.55	9.55	5332.46	5332.46	3911.31	3911.31
SD DV	6359.06	6359.06	0.64	0.64	3596.71	3596.71	8281.46	8281.46
R squared	0.10	0.15	0.17	0.17	0.18	0.13	0.12	0.13
Panel B: Treatment effect of Lockbox, conditional on Loan (Oct and Jan)								
Lockbox	-26.72	237.98	0.08**	0.06	621.55*	505.18	762.34*	-463.28
	(312.31)	(345.79)	(0.04)	(0.04)	(352.71)	(373.76)	(415.09)	(407.64)
Observations	1258	1256	1184	1190	430	432	1272	1271
Mean DV	708.05	284.57	9.45	9.47	3715.63	3823.85	2614.39	3207.12
SD DV	6227.68	6197.31	0.62	0.63	3225.57	3194.25	5947.33	7063.82
R squared	0.12	0.23	0.16	0.17	0.26	0.18	0.14	0.14

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table D.3: **Treatment effects by loan timing (Dep. var. winsorized (5%))** :The dependent variables are Net Revenues, Total HH consumption, Farm Investment and School Fees. Net revenues are measured by the value (in Ksh) of maize sales minus the value of maize purchases that round. The exchange rate during the study period ranged from 80 to 90Kenyan shillings per USD. TotalHH consumption is the log of HH consumption (measured in logged Ksh), aggregated from a detailed 30 day recall consumption module. Farm Investment is the value (in Ksh) of hybrid seeds, DAP (fertilizer), and CAN (fertilizer) used on maize plots in the season following the loan disbursal (because the Year 2 survey only measured the quantities used, average prices from Year 1 are used to get values in Year 2). This variable was only measured in round three for each year, as that is when farmers undertake this investment. School Fees are the expenditures on school fees over the past month (in Ksh). "Lockbox" is an indicator for being in the lockbox treatment group. Panel A shows the treatment effect of the loan treatment. Panel B shows the treatment effect of the lockbox, conditional on being offered the loan treatment. Columns 1,3,5 and 7 shows the treatment effects for October and January loans of the Y1 treatment. Columns 2,4,6, and 8 show the treatment effects for the October loan. The results are pooled for year one and two of the study. Regressions include round-year fixed effects, strata dummies, and controls for survey date, with errors clustered at the group level. The dependent variable is winsorized at 5% "Mean DV" and "SD DV" are the mean and standard deviation of the dependent variable among the control group.

	Net Revenues		Total HH Consumption		Farm Investment		School Fees	
	(1) Oct	(2) Jan	(3) Oct	(4) Jan	(5) Oct	(6) Jan	(7) Oct	(8) Jan
Panel A: Treatment effect of Loan (Oct and Jan)								
Loan	530.67**	-53.50	0.02	0.00	-216.70	-271.51	-116.48	-109.68
	(238.89)	(240.65)	(0.03)	(0.03)	(233.27)	(203.90)	(230.94)	(227.99)
Observations	2534	2536	2535	2534	867	869	2572	2571
Mean DV	24.69	24.69	9.48	9.48	5192.91	4245.24	2815.48	2815.48
SD DV	4834.84	4834.84	0.58	0.58	3137.26	3149.13	5173.96	5173.96
R squared	0.05	0.05	0.04	0.04	0.09	0.07	0.06	0.06
Panel B: Treatment effect of Lockbox, conditional on Loan (Oct and Jan)								
Lockbox	167.66	59.07	0.09**	0.03	597.90	530.48	861.59***	-277.70
	(277.59)	(320.10)	(0.04)	(0.04)	(362.46)	(330.36)	(315.88)	(311.41)
Observations	1259	1261	1258	1257	430	432	1272	1271
Mean DV	362.12	-44.95	9.46	9.47	3662.33	3770.61	2349.57	2776.98
SD DV	5073.20	4834.96	0.58	0.57	2994.07	2914.60	4492.93	5011.96
R squared	0.05	0.06	0.05	0.05	0.13	0.13	0.11	0.09

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table D.4: **Treatment effects** :The dependent variables are Net Revenues, Total HH consumption, Farm Investment and School Fees. Net revenues are measured by the value (in Ksh) of maize sales minus the value of maize purchases that round. The exchange rate during the study period ranged from 80 to 90Kenyan shillings per USD. Total HH consumption is the log of HH consumption (measured in logged Ksh), aggregated from a detailed 30 day recall consumption module. Farm Investment is the value (in Ksh) of hybrid seeds, DAP (fertilizer), and CAN (fertilizer) used on maize plots in the season following the loan disbursal (because the Year 2 survey only measured the quantities used, average prices from Year 1 are used to get values in Year 2). This variable was only measured in round three for each year, as that is when farmers undertake this investment. School Fees are the expenditures on school fees over the past month (in Ksh). "Lockbox" is an indicator for being in the lockbox treatment group. Panel A shows the treatment effect of the loan treatment. Panel B shows the treatment effect of the lockbox, conditional on being offered the loan treatment. The results are pooled for year one and two of the study. Regressions include round-year fixed effects, strata dummies, and controls for survey date, with errors clustered at the group level. "Mean DV" and "SD DV" are the mean and standard deviation of the dependent variable among the control group.

	Net Revenues		Total HH Consumption		Farm Investment		School Fees	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lockbox	132.92	-141.62	-0.01	-0.06*	1.87	-58.55	-489.54	-694.64**
	(313.41)	(260.77)	(0.04)	(0.04)	(275.42)	(252.83)	(424.22)	(287.89)
Loan	473.31**	353.73*	0.01	-0.02	-191.99	-225.18	-266.21	-347.33
	(219.80)	(206.04)	(0.02)	(0.03)	(197.36)	(187.37)	(288.37)	(212.14)
Lockbox*Loan	24.52	313.12	0.05	0.12***	448.51	558.23*	662.45	1087.12***
	(382.48)	(323.04)	(0.05)	(0.05)	(346.54)	(323.03)	(525.06)	(358.54)
Observations	5482	5534	5244	5546	1885	1885	5595	5595
Mean DV	-1616.12	-1616.12	9.55	9.55	5332.46	5332.46	3911.31	3911.31
R squared	0.17	0.12	0.18	0.06	0.24	0.16	0.13	0.07
Baseline controls included	Yes	No	Yes	No	Yes	No	Yes	No
Dep. var. winsorized (5%)	No	Yes	No	Yes	No	Yes	No	Yes

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

E Consumption effects

In this section, we provide further insights and robustness checks on the consumption effects discussed in the Section IV.

Table E.1: **HH consumption - Treatment effect of Lockbox on Loan group** The dependent variable is Total HH consumption. Total HH consumption is the log of HH consumption (measured in logged Ksh), aggregated from a detailed 30 day recall consumption module. Columnn 1 presents results pooled across all rounds, while Column 2 presents results by round. "Lockbox" is an indicator for being in the lockbox treatment group. Panel A shows the treatment effect of the loan treatment. Panel B shows the treatment effect of the lockbox, conditional on being offered the loan treatment. The results are pooled for year one and two of the study. Regressions include round-year fixed effects, strata dummies, controls for survey date, with errors clustered at the group level, and all baseline variables that are not balanced at 10%. "Mean DV" and "SD DV" are the mean and standard deviation of the dependent variable among the control group.

	(1) Overall	(2) By round
Lockbox	0.07**	
	(0.03)	
Lockbox - R1		0.06
		(0.04)
Lockbox - R2		0.06
		(0.04)
Lockbox - R3		0.09**
		(0.04)
Observations	3443	3443
Mean DV	9.52	9.52
SD DV	0.64	0.64
R squared	0.07	0.07

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

In Table 1 we found that combining credit access with a savings technology enables farmers to increase total household consumption. In Table E.1 we show a break-up of the treatment effect by rounds of data collection. The positive and significant treatment effect for round 3 in Table 1 col.1 shows that the increase in consumption is most marked in the lean season. This is a time of particularly high farmer need in which the marginal utility

of household consumption is presumably particularly high. This suggests that farmers use the savings accumulated in the lockbox to fund lean-season consumption. We also observe a positive coefficient for rounds 1 and 2. Contrary to a classic "consumption smoothing" story, in which we would expect any increase in lean season consumption to be matched by dips in consumption in other seasons. Instead we see that consumption is higher throughout the year. This points to a second mechanism that may be at play, where a lockbox helps protect money from the kin tax imposed by family and friends.

F Sharing with Kin

As discussed in Section IV, a lockbox may enable households to shield some money from the kin tax imposed by family and friends. In Table F.1 we look at treatment effects of the loan and lockbox (conditional on loan) on money and maize lent. Columns 1 and 3 show loan amounts (for money and maize respectively) and columns 2 and 4, show a dummy variable for whether a loan was given (for money and maize respectively). We look at whether a lockbox may enable households to shield some money from the kin tax imposed by family and friends, in a setting where there is pressure to share with kin. In Table F.1 Panel A, we see that the "Interact" term is positive for all columns, signifying that farmers who were money or maize "givers" at baseline, are more likely to lend money or maize when they receive a loan. In F.1 Panel B, we see that the "Interact" term is negative across all columns, suggesting that farmers who were money "givers" at baseline, are less likely to lend money when they receive a lockbox. In Panel B (col. 2), we find that farmers who gave more money to friends and family than they received at baseline are significantly less likely to loan money to people in their social network when they have access to a lockbox.This is consistent with the kin tax mechanism discussed in section IV. However, the welfare implications of this reduction in kin tax are not obvious.

Table F.1: **Treatment effects - Triple Interaction Specification** The dependent variables are the value of loans given and the likelihood of giving loans. In columns 1 and 2, we show "Money Transfers" and in columns 3 and 4, we show "Maize Transfers". For Maize Transfers, we calculate value of loans based on baseline expectations of maize prices for that month. In columns 1 and 2, the variable "Giver" refers to farmers who gave more money to friends and family than they received at baseline. In Columns 3 and 4, "Giver" farmers who gave more maize to friends and family than they received at baseline.

	Money Transfer		Maize Transfer	
	(1) Loan Amount	(2) Loan Dummy	(3) Loan Amount	(4) Loan Dummy
Panel A: Treatment effect of Loan				
Loan	-31.27	-0.02*	17.38	0.03*
	(21.47)	(0.01)	(33.55)	(0.02)
Giver	-0.66	0.01	42.80**	0.02**
	(23.59)	(0.01)	(18.93)	(0.01)
Interact	11.51	0.01	26.34	0.01
	(27.18)	(0.02)	(28.61)	(0.01)
Observations	4484	4518	4388	4460
Mean DV	227.19	0.23	278.98	0.26
SD DV	848.55	0.42	980.53	0.44
R squared	0.13	0.04	0.13	0.10
Panel B: Treatment effect of Lockbox, conditional on Loan				
Lockbox	-7.33	0.01	28.11	0.00
	(21.36)	(0.02)	(49.64)	(0.02)
Giver	20.37	0.03***	74.70***	0.04***
	(15.83)	(0.01)	(27.44)	(0.01)
Interact	-29.66	-0.05**	-14.28	-0.01
	(20.66)	(0.02)	(46.38)	(0.02)
Observations	2727	2746	2672	2716
Mean DV	92.69	0.21	357.59	0.29
SD DV	554.28	0.40	1051.43	0.45
R squared	0.14	0.04	0.13	0.11

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table F.2: **Treatment effects** :The dependent variables are Net Revenues, Total HH consumption, Farm Investment and School Fees. Net revenues are measured by the value (in Ksh) of maize sales minus the value of maize purchases that round. The exchange rate during the study period ranged from 80 to 90Kenyan shillings per USD. TotalHH consumption is the log of HH consumption (measured in logged Ksh), aggregated from a detailed 30 day recall consumption module. Farm Investment is the value (in Ksh) of hybrid seeds, DAP (fertilizer), and CAN (fertilizer) used on maize plots in the season following the loan disbursal (because the Year 2 survey only measured the quantities used, average prices from Year 1 are used to get values in Year 2). This variable was only measured in round three for each year, as that is when farmers undertake this investment. School Fees are the expenditures on school fees over the past month (in Ksh). "Lockbox" is an indicator for being in the lockbox treatment group. Panel A shows the treatment effect of the loan treatment. Panel B shows the treatment effect of the lockbox, conditional on being offered the loan treatment. The results are pooled for year one and two of the study. Regressions include round-year fixed effects, strata dummies, and controls for survey date, with errors clustered at the group level. "Mean DV" and "SD DV" are the mean and standard deviation of the dependent variable among the control group.

	(1) Net Revenues	(2) Total HH Consumption	(3) Farm Investments	(4) School Fees
Panel A: Treatment effect of Loan, conditional on money giver				
Loan	861.25	0.08	579.68	-344.45
	(552.10)	(0.07)	(539.67)	(786.43)
Observations	864	860	290	873
Mean DV	-921.96	9.64	5115.09	4921.57
SD DV	6744.97	0.70	3779.10	9890.97
R squared	0.20	0.18	0.17	0.24
Panel B: Treatment effect of Lockbox, conditional on Loan and money giver				
Lockbox	477.50	0.07	939.22	537.09
	(805.17)	(0.10)	(767.86)	(1122.79)
Observations	512	508	171	517
Mean DV	-200.04	9.69	5132.61	4858.28
SD DV	6683.03	0.66	3479.65	9832.94
R squared	0.20	0.21	0.24	0.31

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Next, we investigate whether the increase in Total HH Consumption and Farm Investments documented in IV is driven by net givers of money. We focus on "money givers" as we hypothesize that the a lockbox can help farmers shield money. To study this we run our primary specification (Equations 1 and 2) additionally conditioning on being a money giver and maize giver at baseline. Results are presented in Table F.2. In Table F.2 Panel B, we see that the magnitude of treatment effects are larger than those seen in Table 1. However, we are significantly under-powered to detect any significant effects. This provides suggestive evidence that a lockbox may be p[particularly beneficial to farmers who are "money givers" at baseline, as it helps shield money from kin.

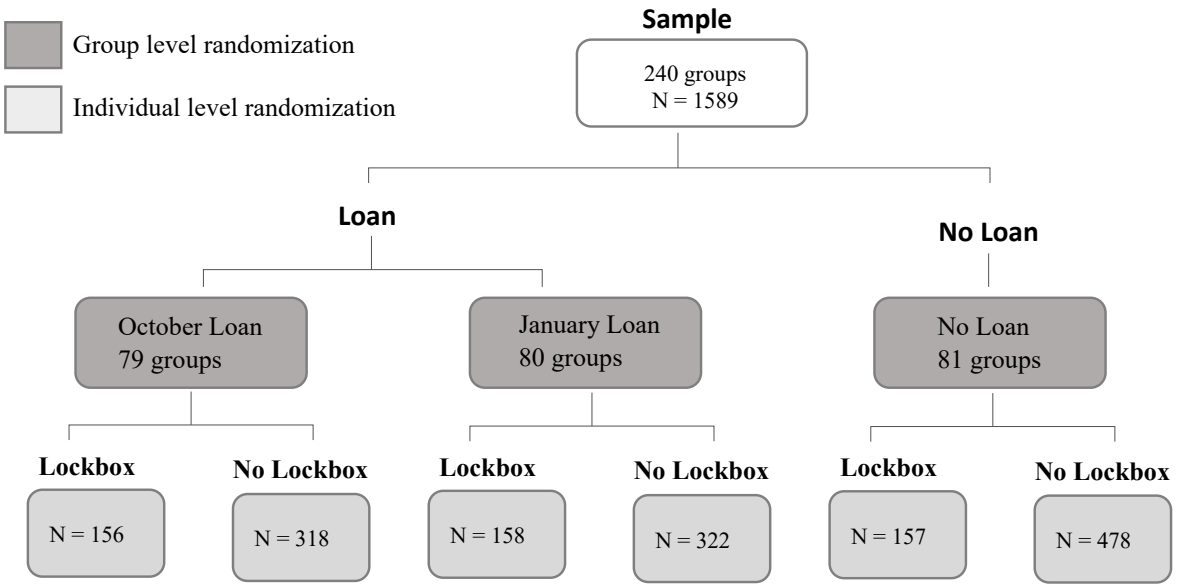
G Loan Timing

In Table G.1 we test if the the treatment effects of the lockbox are significantly different for the October and January Loans. We create an "October" dummy which takes a value of 1 for the October loan and 0 for the January loan. Similarly, we create a "January" dummy. We then interact these with the lockbox treatment.

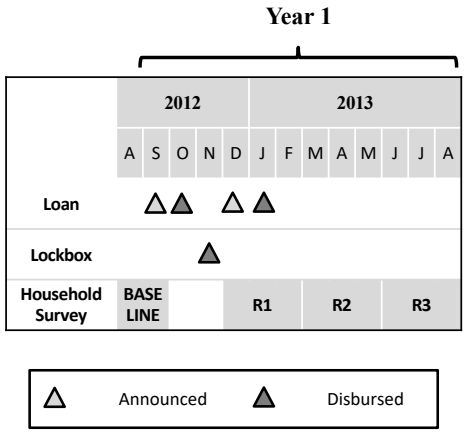
For school fee repayments, we see a significant negative effect of getting only a loan in October or only a lockbox. However, it is worth noting that providing a loan in October with a lockbox offsets the negative effects of receiving only one of the two products. We also find that the October and January loans have significantly different treatment effects for school fee repayments. We also see that the interaction of loan and lockbox treatments is significantly different for the October and January loans. This highlights the complementarity of the two financial products. Therefore, to encourage school fee payments which occur with a lag after harvest one could offer a loan at harvest with a lockbox that helps move money inter-temporally.

It is intuitive that the effects of timely cash or a tool to move cash across time are similar.

Figure G.1: **Experimental design**



(a) **Study design**: There were two levels of randomization in year one- a loan and lockbox treatment. The loan treatment was randomized at the group level. Loans were randomly offered in October and January. The lockbox treatment was randomized at the individual level. Numbers of randomized units are given in the boxes.



(b) **Study timeline**: This figure depicts the harvest periods, timing of interventions and the survey waves.

Table G.1: **Loan timing and Lockbox Interaction**:The dependent variables are Net Revenues, Total HH consumption, Farm Investment and School Fees. Net revenues are measured by the value (in Ksh) of maize sales minus the value of maize purchases that round. The exchange rate during the study period ranged from 80 to 90Kenyan shillings per USD. Total HH consumption is the log of HH consumption (measured in logged Ksh), aggregated from a detailed 30 day recall consumption module. Farm Investment is the value (in Ksh) of hybrid seeds, DAP (fertilizer), and CAN (fertilizer) used on maize plots in the season following the loan disbursal (because the Year 2 survey only measured the quantities used, average prices from Year 1 are used to get values in Year 2). This variable was only measured in round three for each year, as that is when farmers undertake this investment. School Fees are the expenditures on school fees over the past month (in Ksh). "Oct Loan" and "Jan Loan" are dummy variables for receiving the loan in October and January respectively in Year 1 of the study. "Lockbox" is an indicator for being in the lockbox treatment group. Regressions include round-year fixed effects, strata dummies, and controls for survey date, with errors clustered at the group level. "Mean DV" and "SD DV" are the mean and standard deviation of the dependent variable among the control group.

	(1)	(2)	(3)	(4)
	Net Revenues	Total HH Consumption	Farm Investments	School Fees
Oct Loan	494.66	-0.03	-456.42	-1019.69***
	(351.50)	(0.04)	(292.74)	(360.47)
Jan Loan	-86.08	-0.02	-492.73*	-341.63
	(374.21)	(0.04)	(271.25)	(360.00)
Lockbox	-1.09	-0.07	-39.35	-1063.16**
	(424.13)	(0.05)	(378.56)	(419.59)
Oct Loan*Lockbox	209.71	0.15**	531.94	2047.88***
	(547.27)	(0.07)	(530.09)	(576.68)
Jan Loan*Lockbox	202.07	0.09	698.60	548.99
	(603.21)	(0.07)	(515.60)	(579.00)
Observations	3795	3792	1299	3843
Mean of Dep Variable	-1043.90	9.56	5000.87	4166.54
SD of Dep Variable	6378.11	0.64	3498.52	8625.46
R squared	0.03	0.03	0.07	0.06
P-val Oct loan=Jan loan	0.10	0.75	0.89	0.04
P-val Oct int = Jan int	0.99	0.34	0.74	0.01

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$