

Progress report

Testing the impact of contracts to improve financial access for small firms

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Introduction

Transition from subsistence agriculture and to production of higher value-added products sold into a national market is the first step out of poverty for many smallholder farmers. To do this it is important to be able to invest in the appropriate equipment, but many farmers lack the resources to do so. Dairy farming — the largest agricultural sector in Kenya, comprising 4% of GDP and involving approximately 1.5 million smallholder farmers — is a case in point. One of the central challenges in dairy farming is adequate supply of water for cattle. This is exacerbated by climate change and drought. Without a reliable supply of water, people have to spend significant time and effort fetching water, the burden of which falls disproportionately on women and girls. Previous research found that access to a water tank reduced the amount of time girls spent fetching water by 35 percent, which in turn increased the probability that girls were enrolled in school increased by 4 percentage points (Jack et al. 2019).

Financing products such as water tanks can be a challenge for smallholder farmers. One approach to this is microfinance. However, while evidence is somewhat mixed, in general the impact of traditional microfinance loans on farm and business investments is often quite disappointing. In developed countries, most businesses invest using asset-collateralized loans, though those are rare in developing countries. This project seeks to identify and evaluate a financially sustainable and scalable approach to offering asset-collateralized loans. By doing so, smallholder farmers will be able to access technologies such as rainwater harvesting tanks, which in turn enable them to increase production through practicing zero-grazing, improve cow health through preventing exhaustion and exposure to pathogens, and increase girls' school enrollment (Jack et al. 2019).

In rich countries, much investment is based on asset-collateralized loans, in which the borrowers receive the assets they are investing in upfront and pay off over time, with repossession as the penalty for default. This structure is much less common in developing countries, where many farms and small businesses have high returns to capital (Banerjee and Duflo 2005), but lack access to finance. Traditionally structured microfinance loans are often securitized by large cash savings paid up front. Despite being used to purchase long-lived assets, these loans must be paid off quickly and starting immediately. Such loans have had a disappointing impact on business investment and growth (Banerjee et al. 2015).

This project builds upon previous work that showed asset-collateralized loans dramatically increase dairy farmers' access to agricultural equipment — rainwater harvesting tanks in particular — with minimal default (Jack et al. 2018). In this project, we study the scalability of these loans, introducing variations in contract terms with the end goal of developing financial infrastructure to allow sustained access to credit. We evaluate take-up and repayment rates with different price points, contract term lengths, and contract structures. We also measure the impact of providing assets on productivity through collection of administrative data on milk sales, and through surveying farmers on how practices have changed following access to water tanks and chaff cutters.

Literature Review

Investment in equipment is an important step in the transition of farmers from subsistence farming to production of higher-value crops for sale to the market. For example, dairy farming requires a regular supply of water for cattle, and a limited supply requires many farmers must travel considerable distances to fetch water (Nicholson 1987, Staal et al. 2001). Providing a means of collecting rainwater may also reduce exposure to rainfall risk, which has been exacerbated by

climate change. Additionally, the practice of “zero-grazing,” in which farmers feed cows in a stationary location rather than bringing them to pasture, may improve cattle health by reducing energy expenditure and exposure to illnesses found in local streams and ponds (Gitau et al. 2000, Kristjanson et al. 1999); however, this practice requires a consistent water source at home.

In Jack et al. (2018), dairy farmers in central Kenya were offered asset-collateralized loans toward the purchase of rainwater harvesting tanks, in partnership with a local financial institution. Offering asset-collateralized loans dramatically increased credit take-up: just 2% of borrowers offered standard loan contracts accepted them, but 24% of borrowers accepted offers for loans that were 75% collateralized with the tank itself. When collateralization was increased to 96%, take-up rates increased to 42%. At the same time, repayment rates remained high: out of the 1,159 loans issued, only three tanks were repossessed. All three defaulters were in the group that paid only a 4% security deposit. Moreover, in cases of default, the tanks were successfully repossessed and resold at a high enough price to recover the initial capital and interest.

In subsequent research, Carney et al. (2019) study the behavioral mechanisms behind the demand for asset-collateralized loans. They find that borrowers experience an endowment effect over assets they already own, making them less willing to put existing assets at risk as collateral for a loan. Asset-collateralized loans do not put existing assets at risk, and the item being purchased has not yet entered the borrower’s endowment at the time of loan take-up decisions, making these kinds of loans more attractive to borrowers than other financing options. This behavioral mechanism accounts for an estimated 14% increase in borrowers’ willingness to pay for asset collateralized loans.

The current project links these literatures by studying asset-collateralized loans from the vantage point of the lender. While asset-collateralized loans have been demonstrated to be

attractive to borrowers, understanding whether they are a viable option for lenders and can perform at scale is an important policy question.

Model

Under the endowment effect, borrowers will be more willing to collateralize loans with the asset they purchase, rather than existing assets, because they particularly dislike losing what they already own. However, once they obtain the new asset, their reference point may shift, making them averse to losing the asset, and willing to work hard to repay the loan. Carney et al. (2018), a companion project, shows evidence of such a mechanism. They find that borrowers would require an interest rate cut of 8% per month to collateralize with their existing assets rather than with new assets.

Under present bias, farmers may have difficulty saving, so may be unable to make investments. ACLs can serve as a commitment device for farmers who are sophisticated about their present bias. The commitment effect is particularly strong under the endowment effect, since farmers suffer a utility penalty if they default and lose the asset. However, repossession is also costly for lenders; lenders therefore require substantial down-payments before offering ACLs. Layaway contracts, in which the financial institution provides the asset once payments into the labeled account are complete, provide a softer commitment, with lower risk for both borrowers and lenders (e.g. Karlan and Linden 2014).

This suggests a third type of contract: layaway contracts with the option to convert to ACLs once a sufficient amount has been saved for a down payment to make the lender and borrower willing to accept the risk of an ACL.

Evaluation Design

Using a randomized experiment, we vary the contracts offered along the following dimensions to study the impact on take-up, payment, and production:

Price variation: We randomly offer borrowers discounts to determine how the price of a given asset affects take-up and repayment. This also provides insight on the optimal price such that the contract remains attractive to borrowers while allowing lenders to cover associated administrative costs when offering loans at scale.

Hybrid loan-layaway contract: The lender's current program requires a security deposit that inhibits credit access for many borrowers. Our project evaluates take-up and repayment rates for borrowers in three primary groups: (a) asset-collateralized loans as they are currently offered by the lender in which the borrower must pay the required security deposit upfront, (b) a "layaway" savings plan, in which the farmer receives the asset only after saving the total amount, and (c) a hybrid contract, in which the borrower saves toward the required security deposit in an account specifically linked to the contract, at which point they can convert to an asset-collateralized loan. We hypothesize that this third option will make asset-collateralized loans more accessible to potential borrowers without requiring the lender to take on additional risk.

In order to separate out whether observed payment behavior is due to the borrower's unique characteristics (e.g. differences in cash flow) or in response to the structure of the contract, half of the farmers who accept the layaway contract randomly receive an offer to upgrade to an asset-collateralized loan.

Loan term variation: Half of the study participants receive a two-year contract, with the remaining participants receiving a three-year contract (cross-randomized with other types of variation) to determine whether take-up and repayment vary for different term lengths.

Asset variation: Rainwater harvesting tanks are in some ways ideal for asset collateralization: they are durable, large and attached to borrowers' homes, and thus locating and potentially repossessing them in case of loan default is a credible action. To learn whether asset-collateralized financing works well in practice for other useful productive assets, we also offer products other than water tanks, such as chaff cutters, which are used to prepare feed for livestock.

Protection against default: On a randomized basis, we offer borrowers two main types of protection against income shocks and seasonal fluctuations in income: (a) a contract that enables the borrower to delay principal repayment for three months (while still accumulating interest) and (b) a contract that offers payment relief to borrowers if other farmers in the area also have low production. This second type of contract helps farmers avoid default when confronted with exogenous shocks such as unfavorable weather events and low milk prices.

Measurement and Sample

Previous research suggests the possibility that enabling farmers to purchase rainwater harvesting tanks may increase farmers' incomes (Jack et al. 2018). To further this evaluation, we collect administrative data on milk sales for both the previous sample and the new sample, enabling us to detect increases in farmers' milk production. Through this data, we can evaluate whether creative financing not only improves credit access, but also results in increased income generation. Future research will enable us to assess whether these results hold in a larger sample. In addition to collecting administrative data on milk proceeds, we also survey both the previous sample and the new sample in order to further understand the impact of the innovations we are testing.

Results and Policy Implications

One of the primary goals of the project was to identify financing contracts that are not only attractive to borrowers, but also to lenders, and therefore scalable. Preliminary qualitative evidence

suggests substantial interest in asset-collateralized loans among borrowers. Since the Jack et al. (2019) study, our partners organization, a savings and credit cooperative organization (SACCO) has begun their own independent ACL program for rainwater harvesting tanks, offering loans that are 75% collateralized by the tanks themselves.

Recently, our policy outreach has resulted in the SACCO pledging a further US\$400,000 in financing toward the ACL program, a further indication of supply-side interest in these financing contracts. We view this as evidence of the potential of ACLs to succeed at scale outside. Other agricultural SACCOs in Kenya have also expressed interest in adopting the program. However, experimental results from the study are still pending. Take-up results will be available at the beginning of 2020, when all contract offers have been made. Results on payment and milk revenues will be available upon completion of the contracts in two to three years. These experimental results will be what ultimately determines the policy implication of the program.

Conclusion

In this project, we seek to identify financial contracts that are attractive to borrowers and lenders alike, and therefore scalable. We study three scalable financial instruments designed to address behavioral constraints that may limit small firms' financial access, investment, and technology adoption: asset-collateralized loans (ACLs), layaway contracts, and a hybrid layaway-ACL contract. To do so, we work with a Kenyan lender offering financing options to dairy farmers to invest in rainwater harvesting technology.

ACLs, wherein the asset being purchased is itself used as collateral, are ubiquitous in developed countries (e.g. mortgages, car loans and business-equipment loans). However, such loans are much less common in the developing world and require high down-payments when available. Recent research (Jack et al. 2018) finds that ACLs may dramatically increase take-up of

loans, while achieving high repayment rates. This could partly be because they address two behavioral barriers: the endowment effect and present bias.

We also test the impact of several other innovations, including price variation between wholesale and retail prices, and insurance. While experimental results from the evaluation are still pending, preliminary qualitative evidence suggests substantial interest in asset-collateralized loans among borrowers. One notable recent example is the lender we partner with recently committing a substantial amount of capital to expanding the program. Other lenders have also expressed interest in offering asset-collateralized loans. Experimental results, when available, will provide more robust evidence on the scalability of these loans and the mechanisms that explain the borrower and lender response.

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