

# Unlocking Credit with Lockout Technology in Uganda: Using Solar Systems as Digital Collateral for School Loans

*Study shows increased repayment rates alongside improved educational outcomes with improvements needed in lender profitability*

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## Understanding the problem

Creditworthy households are often excluded from traditional financial services and cannot access credit when necessary. There are many factors driving this exclusion, but one relates to collateral. Collateral is an asset that a borrower provides to secure a loan with a lender. Securing loans with collateral helps lenders identify credit-worthy borrowers and provides incentives for repayment, allowing lenders to offer credit at affordable interest rates. In traditional settings, collateral takes the form of a house or vehicle. In many lower income, rural contexts, traditional collateral is limited due to weak property rights and the high cost to a lender to physically repossess collateral in remote areas. The consequence is it is more challenging for lenders to identify creditworthy borrowers and provide them access to credit when needed.

This is a common problem facing Ugandan households. A well-known consequence is difficulty with paying for primary and secondary school fees and supplies. School fees and school-related expenditures constitute a non-trivial portion of household expenses. Households with school-enrolled children spend 14% of income on primary education and 21% on secondary education. These fees are often required out of the harvest cycle and during periods of low income in rural Uganda.

Social entrepreneurs who can identify responsible borrowers and use financial technology innovations to address these constraints can offer solutions to these challenges.

## Identifying a solution

From 2015-2019, Fenix International offered Ugandan households pay-as-you-go (PayGo) loans for solar home systems (SHS). Solar home systems, which include solar panels, batteries, and appliances, provide households with electricity to light their homes, charge mobile devices, and power small appliances. Households who successfully paid their SHS loans were identified as responsible borrowers and became eligible for follow-on loan products, including school-fee loans.

The critical innovation was turning the SHS into a form of collateral. Using lockout technology, Fenix International could temporarily disable the SHS if borrowers failed to make payments. The use of lockout technology resolved key problems related to property rights and costly repossession of collateral. Similar technology has been deployed in smartphone financing (PayJoy), utility payments (TELMEX), and auto loans (subprime lenders in the U.S.).

## Applying research methods for learning

To test the impact of securing loans with digital collateral, Fenix International collaborated with the research team to design and implement a **randomized control trial** with three treatment arms:

- **Secured Loans (T1):** 300,000 UGX (\$81 USD) loan with digital collateral.
- **Unsecured Loans (T2):** 300,000 UGX (\$81 USD) loan without digital collateral.
- **Surprise Unsecured Loans (T3):** 300,000 customs were initially offered a secured loan. If accepted, the loan they received was unsecured. This treatment group was designed to separate the role of collateral in identifying credit worthy borrowers from its effect on increasing repayment for otherwise identical borrowers.

## Measuring impacts on outcomes

- Loans secured with digital collateral had **lower take-up rates and higher repayment rates**, suggesting riskier borrowers were screened out. **44% of households** offered the secured loan took the loan compared with **51% of households** offered the unsecured loan. For loans secured with digital collateral, **repayment rates** increased **13 percentage points** compared with either unsecured loan group at both 100 days (from 46% to 59%) and 150 days (from 57% to 70%). One third of this increase in repayment was due to screening, while two thirds were attributed to better repayment incentives.
- Secured loans with digital collateral significantly increased lender profitability. However, even **secured loans were not profitable**. This finding can most likely be attributed to the fact that lender standards were relaxed for the purpose of the study, but it also suggests that **additional forms of screening are necessary to ensure stability**.
- For households who were offered school-fee loans, **school enrollment** increased by about **3 percentage points** (from 88% to 91%) and analysis of **school expenditures** shows households with the secured and unsecured loans spent **26% more** on school-related expenses (fees, uniforms, supplies, transport, meals) resulting in an equivalent of about **\$20 USD** per child.



*Solar panels from field visit (Photo by Wade Lahring)*

## Applying learning to social entrepreneurship

Social entrepreneurs who want to create new means to access credit through digital collateral may use these findings to inform borrower eligibility criteria and definitions of loan terms to ensure adequate take-up, repayment, and profitability rates alongside social impact goals.

Policymakers may want to further explore and understand how lockout technology is deployed and what risks exist to consumers for potential exploitation or misuse and how this may be balanced with the benefits of access to credit.

This study also illustrates how delinquent borrowers in early rounds of loan intervention may lose out on future rounds. Both social entrepreneurs and policymakers may consider what complementary interventions – such as financial literacy training - can support moving initially delinquent borrowers into responsible borrower status. This is especially critical for financial inclusion efforts more broadly.

## Conclusion

Securing loans with digital collateral is an innovation which can support financial inclusion in regions with weak property rights and high costs of physical repossession of traditional forms of collateral. However, the effectiveness of digital collateral leveraging lockout technology may be context specific. While positive in this unique setting, additional research is required to continue to understand the impacts of this technology on lender outcomes - including loan terms that improve profitability - and borrowers' social and economic outcomes.