

Joint Liability, Asset Collateralization, and Credit Access: Evidence from Rainwater Harvesting Tanks in Kenya

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Research question

Many small firms in developing countries have high returns to capital

- Fafchamps et al. (2011), Kremer et al. (2011), de Mel et al. (2008, 2009), McKenzie and Woodruff (2008)

Yet formal credit markets in many developing countries are small.

- Barriers: often high deposit or collateral requirements

Research question: are the credit barriers too high or is it possible to lower them under certain conditions and still achieve high repayments?



SETTING



The dairy industry in Kenya

Dairy industry accounts for 3.6% of GDP

About 1 million dairy farmers

56% of milk produced by smallholders: 1-3 cows

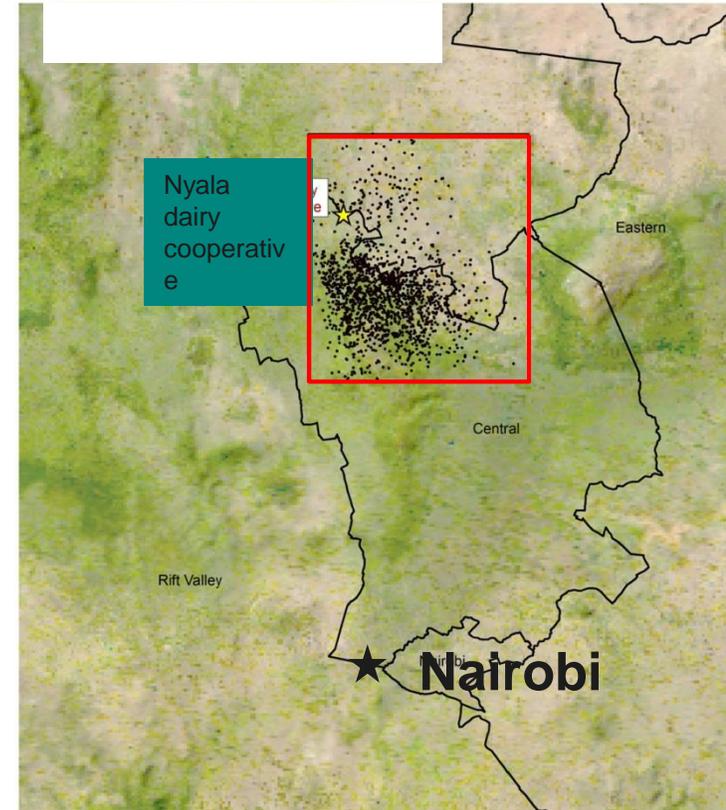
Specific setting this study: Nyala dairy cooperative



The Nyala Dairy Cooperative



Figure 1: Map of the Area in Central Kenya



7,000 farmers sell milk to Nyala each day





Water Environment

Water needed for people, cows

- Women spend 21 minutes on average per day fetching water (men spend 7 minutes)
- Men spend 102 minutes on average per day tending livestock (women spend 54 minutes)

32% of households have piped water

- Intermittent service

43% of households have a water tank

- 24% have tank > 2500 liters
- Mostly non-durable stone or metal



Standard cooperative loan is difficult to get

Members, and some non-members, hold savings with the SACCO

The SACCO makes some loans to members

- Livestock services: feed, artificial insemination, etc.
- Non-farm needs: school fees, emergencies

The SACCO requires one hundred percent cash collateralization:

- savings of borrower of 1/3 of loan
- three guarantors with shares and/or savings of 2/3 of loan



EXPERIMENTAL DESIGN



Loans for 5000 liter water tanks

Lightweight, durable

Filled from roof (mostly corrugated iron in this area), or with piped water

Cost: 24,000 KSh = \$320 (20% of annual household consumption)



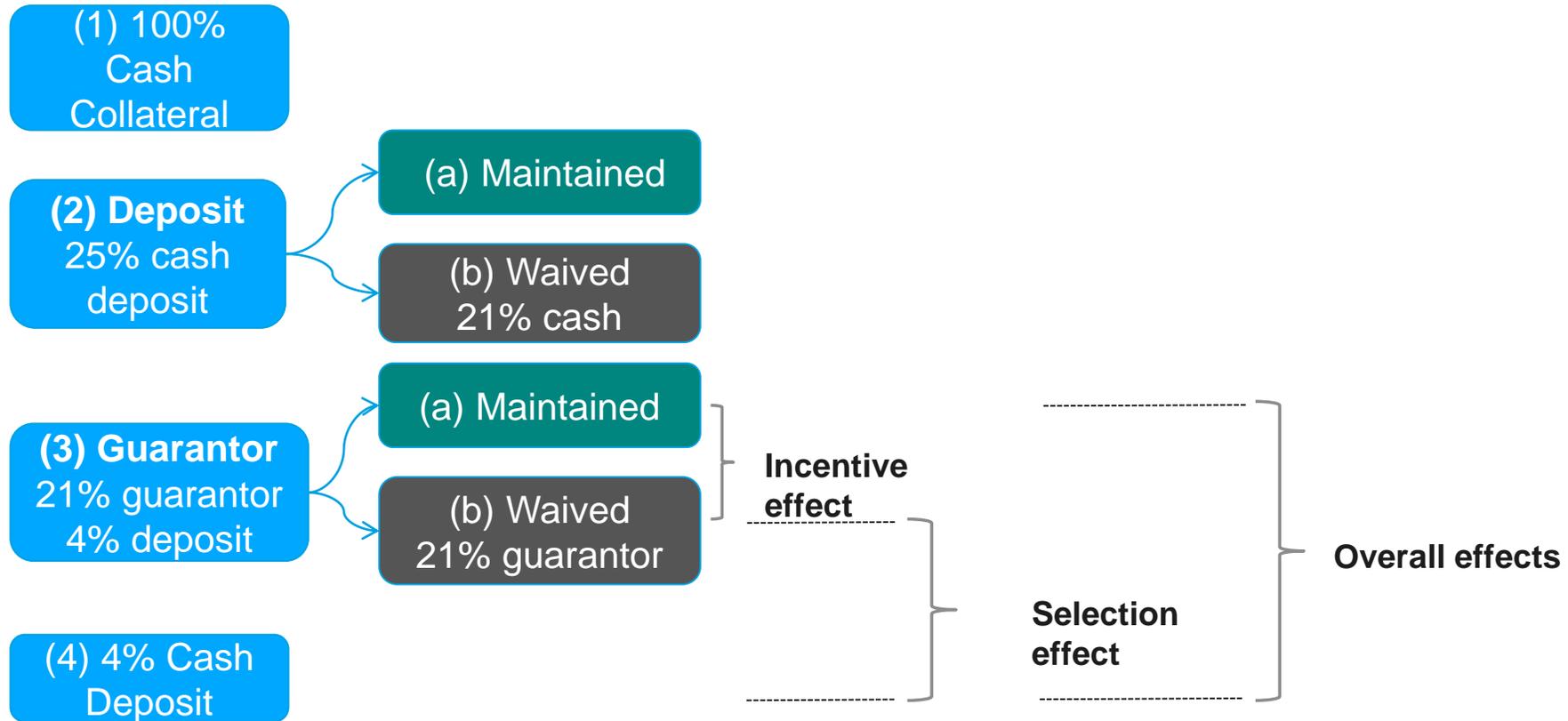
Our experiment: 4 loan types

Loan type	Cash deposit from borrower	Cash deposit from guarantor	Tank collateral
(1) 100% Cash collateralized	8,000 KSh	16,000 KSh	0
(2) 25% Deposit	6,000 KSh	0	18,000 KSh
(3) 21% Guarantor 4% Deposit	1,000 KSh	5,000 KSh	18,000 KSh
(4) 4 % Deposit	1,000 KSh	0	23,000 Ksh

- All loans for 24,000 Ksh



Additional experimental sub-groups were created



Standard credit terms for all 4 loan types

Term: 24 months

Repayments: 1,000 KSh per month plus 1% interest per month on the declining balance

Repayments are deducted from monthly milk sales

All treatment arms: 1% late fee



1,804 loan offers were made

1,804 loan offers (March 2010 to Feb 2011)

- **100% cash-collateralized loan: 419 offers**
- **25% deposit loan: 450 offers**
- **4% deposit, 21% guarantor loan: 425 offers**
- **4% deposit loan: 510 offers**

Follow-up surveys conducted 2010/11/12

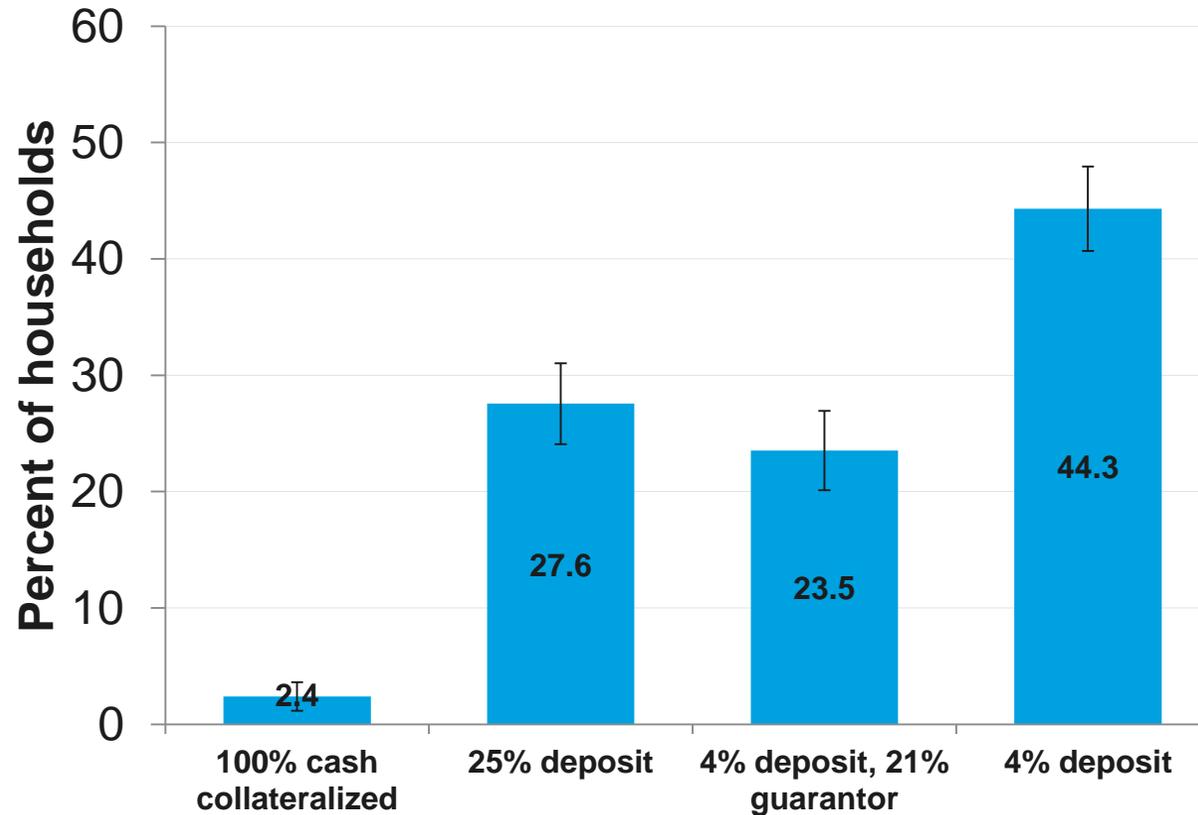
2616 additional loan offers in 2012



RESULTS: LOAN TAKE-UP



Large impact on take-up



Note: Error bars represent 90% confidence intervals.



Take up rates and borrower selection

- **Loan take up:**
 - **Very sensitive to deposit requirements**
 - **No evidence that guarantor contracts increase access to credit** relative to deposit requirements.
- **Selection: Who borrowed?**
 - **Borrowers tend to have more assets**, higher per capita income, and more cows than non-borrowers; but differences are not large.



LIVELIHOOD IMPACTS OF THE TANKS



Intention-to-treat impacts

Going from 100% cash collateral to 4% cash collateral offer:

Access to water improved

- 45% of all households had a tank at baseline; increases by 17.5 percentage points (35%)
- Increases tank volume by 60%

No significant increase in milk production

- No significant increase in milk production

Time use improved

- With piped water: girls reduce time tending livestock
- Without: girls reduce time fetching water and boys reduce time tending livestock

Schooling improved

- Reduction in in girl drop-out

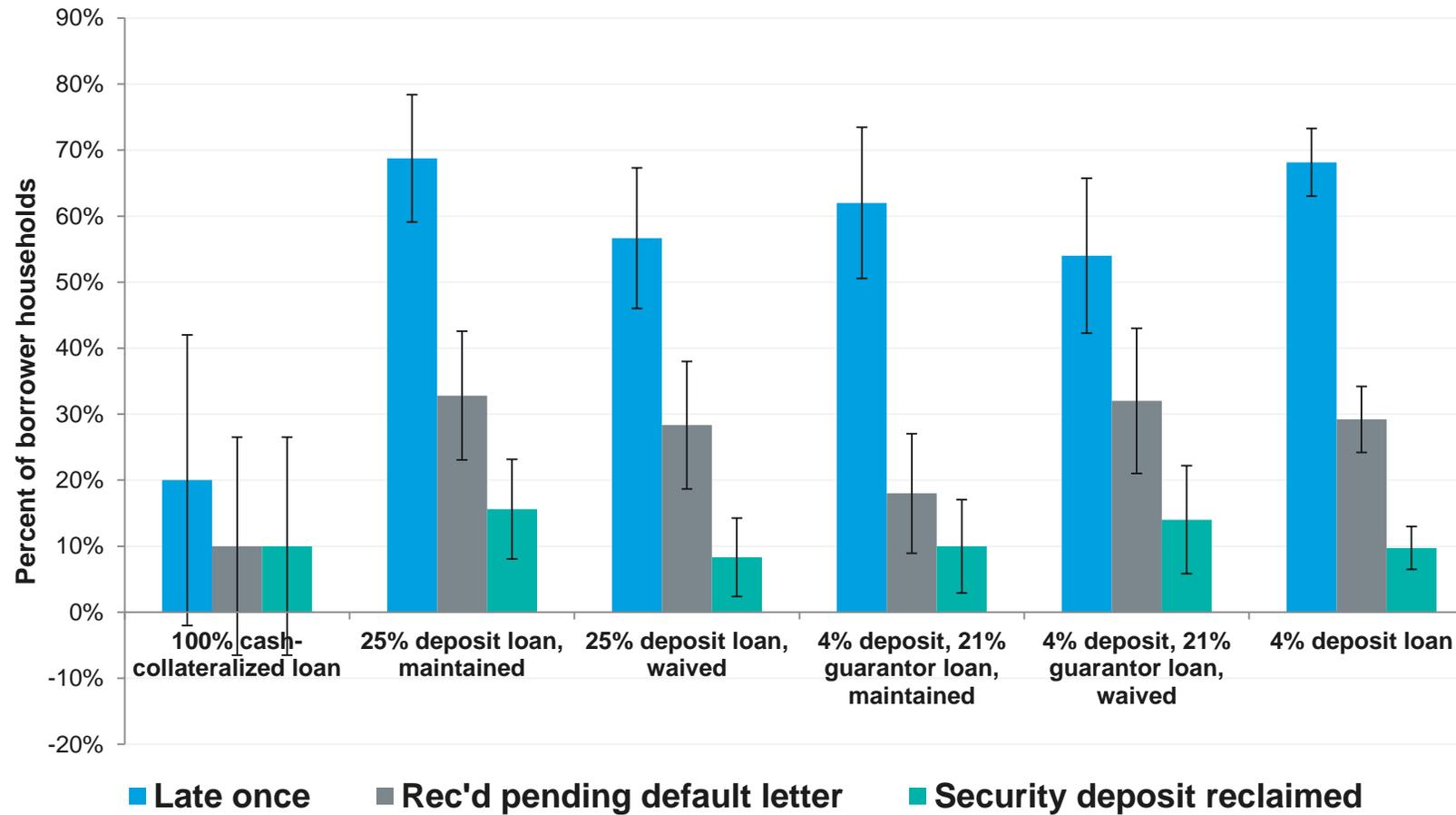


LOAN REPAYMENTS



Occasional late payments were common

Late Payment Incidence



Note: Error bars represent 90% confidence intervals.



All loans fully recovered

All loans fully recovered

3 tank repossessions – all in 4% cash deposit group

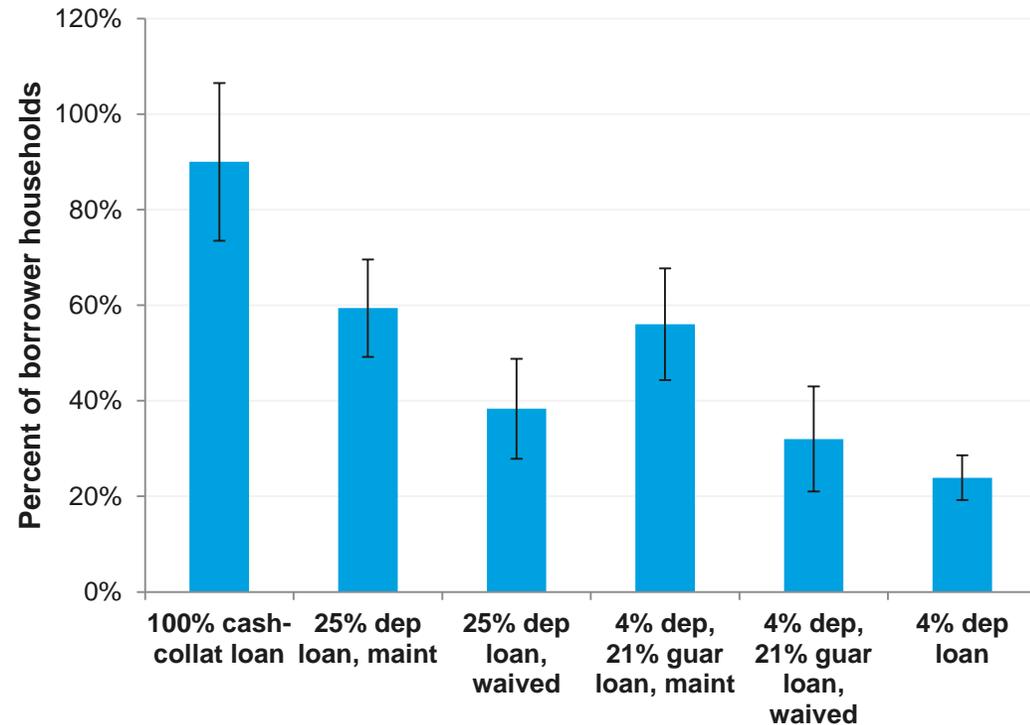
Reject hypothesis that tank repossession in 4% group equals repossession in the combined 25% group.

Note: Plausible that 4% group is not profit maximizing given low returns to lender in this experiment, but would be optimal from social policy perspective.

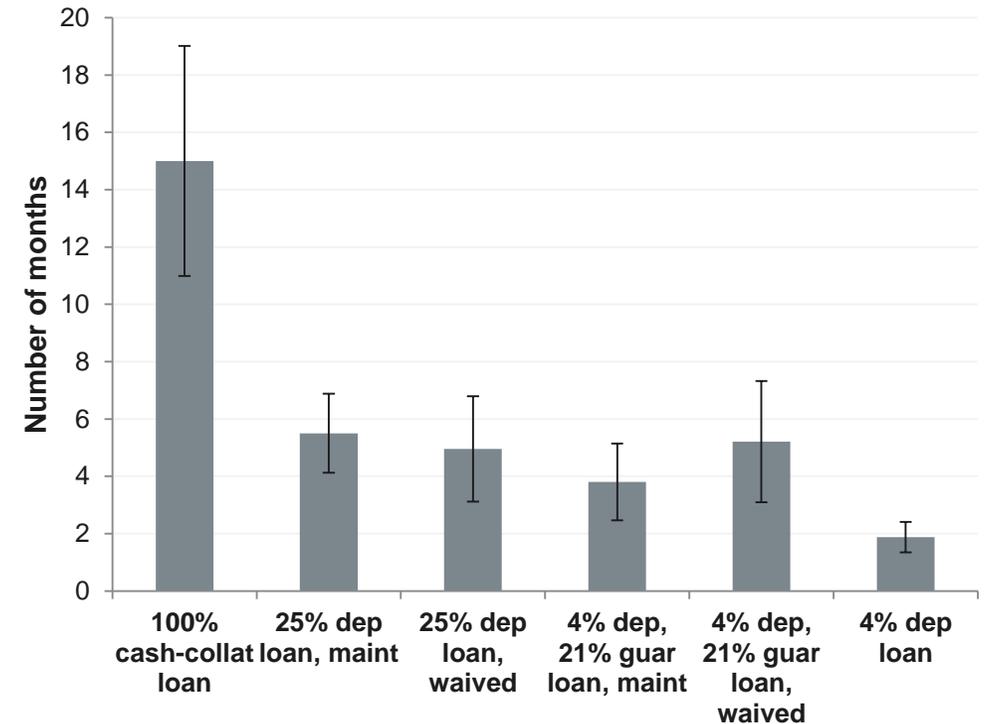


And early overall repayment was common

% Repaid loan early



Months early



KEY RESULTS



Loan take up is very sensitive to deposit / guarantor requirements

Guarantor option does not expand access much relative to deposit requirements

All 4 loan types provided by the cooperative had very high repayment rates, early repayment was common

3 defaults in lowest deposit requirement loans, but all loan amounts recovered (thru tank sale)

Positive impacts on time use and girl education



DISCUSSION AND THANK YOU!

