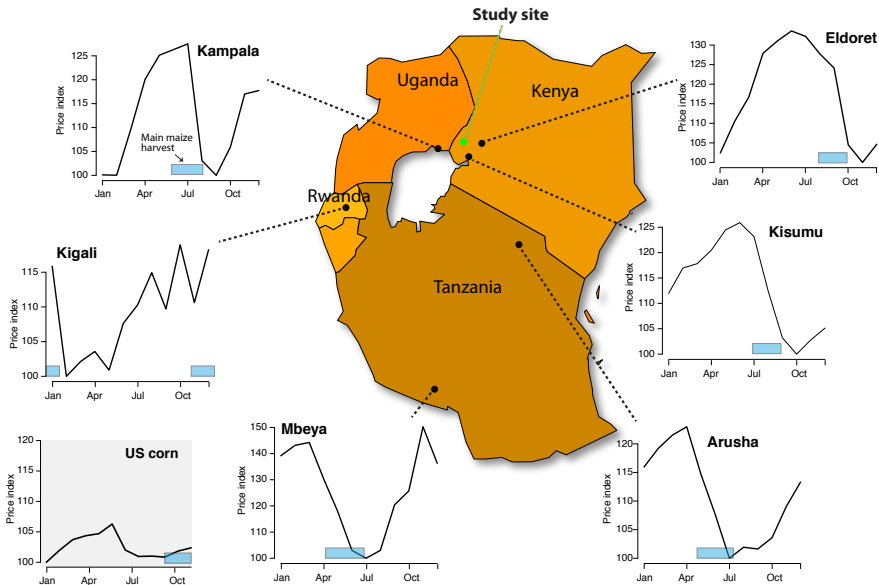## Behavioral Economics Forum

Feed the Future Innovation Lab for Markets, Risk and Resilience

Lauren Falcao Bergquist
Yale University

February 2024
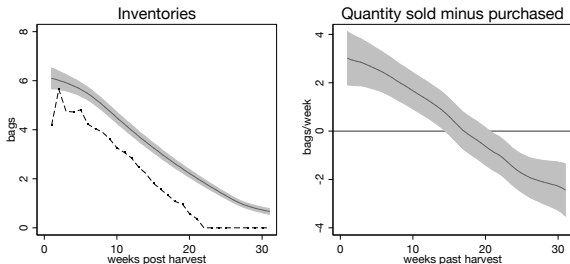
Large seasonal price fluctuations

Storage as an arbitrage tool

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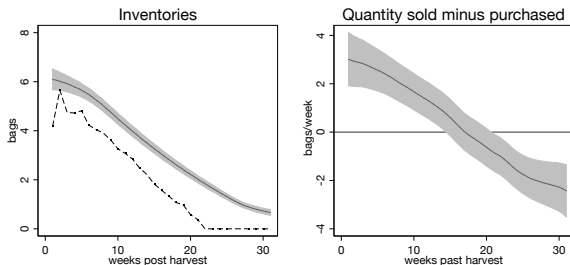You might think: maize is storable $\rightarrow$ buy low, sell high

Instead, farmers **sell low, buy high:** households appear to be selling low at harvest or buying high later in the season – and often both

$\Rightarrow$ Median HH in our sample appears to be giving up $\sim$ 1-2 months of agricultural wages by selling low/ buying high, instead of the reverse

Arbitrage puzzle: why not storing?

Most common explanation from farmers: credit constraints

- High harvest-time expenditure needs must be funded by harvest-time sales
- Partner with One Acre Fund to randomly offer a harvest-time loan to smallholder farmers ($\sim$ \$100)

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- Mental accounting, kin tax, lack of access to safe savings
- Cross-randomize with a simple savings technology: lockbox

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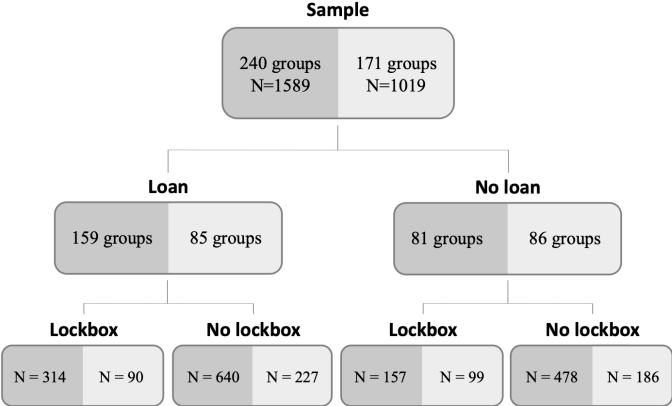- Cross-randomize with a simple savings technology: lockbox

$\rightarrow$ **Can relaxing a "hard" constraint (credit) $+$ a "soft" constraint (behavioral nudge to save) unlock dynamic gains?**

Design

Year 1

Year 2

Sample

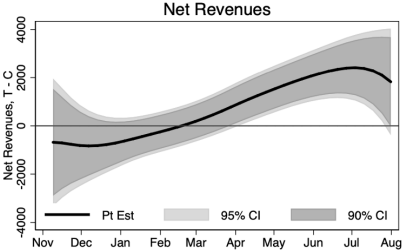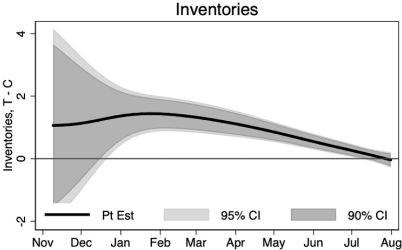| 240 groups N=1589 | 171 groups N=1019 |

Group-level randomization (Loan treatment was re-randomized in Year 2)

Loan

| 159 groups | 85 groups |

No loan

| 81 groups | 86 groups |

Individual-level randomization

Lockbox

| N = 314 | N = 90 |

No lockbox

| N = 640 | N = 227 |

Lockbox

| N = 157 | N = 99 |

No lockbox

| N = 478 | N = 186 |

Impacts of the loan

Impacts of the loan

Impacts on revenues, consumption, and investment

	(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

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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

Interaction   Lockbox Alone

Mechanisms

Consumption and Dis-savings Trends

Treatment Effect of Lockbox of HH Consumption
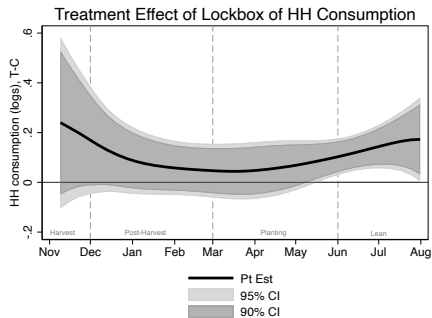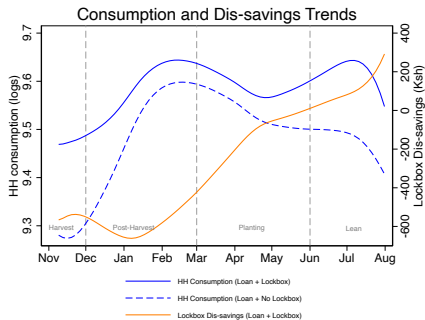
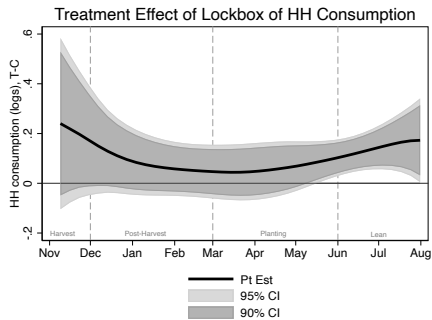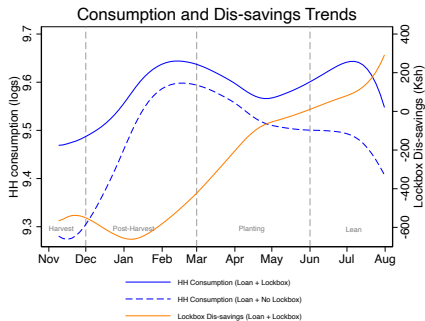Lockbox enables movement of funds inter-temporally:

- Safe place to save
- Mental accounting

Mechanisms

Consumption and Dis-savings Trends

Treatment Effect of Lockbox of HH Consumption

But level shift in consumption as well:

- Kin tax (Dupas and Robinson, 2013; Jakiela and Ozier, 2016)
- Also see HHs that are highly taxed by kin at baseline are taxed less when have access to a lockbox

Conclusion

- Interplay of constraints:
  - Credit alone may insufficient to generate sustained consumption gains or business growth for the majority of HHs (Banerjee et al., 2015; Meager, 2016)
  - May also need to address savings constraint to channel increased revenue into future investments

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- Especially powerful to combine relaxation of "hard" constraints with behavioral nudges to relax "soft" constraints (mental accounting, kin tax, etc.)
  - We see this not just in agriculture, but in other settings too
  - E.g. adding incentives for parents to attend vaccination clinics in India (Banerjee et al. 2010)

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→ **Behavioral nudges as turbochargers**

Complementarity Between a Loan and Lockbox

	(1) Net Revenues	(2) Total HH Consumption	(3) Farm Investment	(4) 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

Back

Treatment Effect of Lockbox Alone

	(1) Net Revenues	(2) Total HH Consumption	(3) Farm Investment	(4) School Fees
Lockbox	-217.48	-0.06	105.29	-803.48*
	(326.69)	(0.04)	(311.66)	(455.64)
Observations	2098	2103	713	2122
Mean DV	-1043.90	9.56	5000.87	4166.54
SD DV	6378.11	0.64	3498.52	8625.46
R squared	0.18	0.10	0.18	0.08

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