The Impact of Seasonal Food and Cash Loans on Smallholder Farmers in Zambia

Research Methods and Results

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Key Objectives

• Introductions
• Research design revisited
• Data collection
• Additional findings
• Discussion throughout!
Sampled Population: Small scale farmers in 175 villages (N=3200)

Year I
- Control group: 58 villages
  - Control Group: N=38
  - Maize loan: N=10
  - Cash loan: N=10

Year II
- Maize loan: 58 villages
  - Control: N=28
  - Maize loan: N=30

- Cash loan: 59 village
  - Control: N=29
  - Cash loan: N=30
Research design: Treatment arms

Two treatment arms:

1. Cash loan
   - Receive: 200 Kwacha in January
   - Pay back: 260 Kwacha or 4 x 50 kg bags of maize in June/July

2. Food loan
   - Receive: 3 x 50 kg bags of maize in January
   - Pay back: 260 Kwacha or 4 x 50 kg bags of maize in June/July
Research design: Designing comparable loan treatment arms

- How do these loans compare?
  - value in January: maize more valuable
  - value in June: repay maize cheaper
  - other considerations: transaction costs

- Choice experiments
  - suggest indifference between the two loan types at the value offered

- Income effect control: sub-sample of control villages received a 60 Kwacha gift
Research design: Additional sub-treatments

Additional “cross cutting” treatments in year 2 only

1. Early announcement
   Half of the treated villages in year 2 were informed about the loan in September; other half had year 1 timing (January)

2. Cash-only repayment
   Half of the treated villages in year 2 were required to repay in cash (informed of this before take up)
Research design: Timing

Share of households reporting food shortages

- September
- October
- November
- December
- January
- February
- March
- April
- May
- June

Crop activities:
- Planting
- Weeding
- Harvest

Loan announced
Repayment collected
Research design: Timing, Year 1

- **Loan announced**
- **Loan repayment**

### Share of households reporting food shortages

- **September**
- **October**
- **November**
- **December**
- **January**
- **February**
- **March**
- **April**
- **May**
- **June**

### Loan intervention

- **Planting**
- **Weeding**
- **Harvest**
Research design: Timing, Year 2

- Monthly maize drops
  - Planting
  - Weeding
  - Harvest
- Loan announced
  - Repayment collected
- Share of households reporting food shortages:
  - September
  - October
  - November
  - December
  - January
  - February
  - March
  - April
  - May
  - June

- Early loan intervention
- Late loan intervention
- Loan repayment

Bar chart showing the share of households reporting food shortages over the months of the year, with peaks in February and March.
Randomization: why and how

- Impact evaluation is difficult!
  - Farmers who join a program are different from those who do not
  - Conditions change over time

- Random assignment ensures that treatment and control group are – but for the intervention – statistically the same
  - With a large enough sample, compare outcomes and learn the causal impact of the programme
Randomization check

• Compare farmer and village characteristics by treatment
  • Randomization implies that observable characteristics are balanced
  • Assume unobservable characteristics are also balanced
Randomization implementation

Year 1: Randomly assigned villages to control, cash and maize loans, checking for balance on variables measured at baseline

Year 2: Re-assign main treatments, rotating between treatment and control, balancing again on baseline variables + year 1 treatments and year 1 harvest output

Sub-treatments: Cross-randomize sub-treatments, balancing on baseline variables + main treatments in both years

Do all of this via computer code (Stata do-file), using baseline data as an input
Data collection: Timing, Year 1

- Share of households reporting food shortages
- Months: September, October, November, December, January, February, March, April, May, June
- Key phases: Planting, Weeding, Harvest
Data collection: Survey rounds

- **Baseline survey** (N=3141): Pre-planting survey (Oct-Nov) of all eligible households

- **Harvest survey** (N=3031): Harvest season (July-Aug 2014) survey of all eligible households

- **Endline survey** (N=3005): Harvest season (July-Aug 2015) survey of all eligible households

- **Midline survey** (N=1193): Hungry season (Feb-Mar) survey of a random 1/3 sample of households

- **Labor survey** Rotating sample (Mar 2014-Aug 2015); ~14 households/day

- **Employer survey** Rotating sample (Mar 2014-Aug 2015); ~10 employers/week
Data collection: Survey sampling

• Main surveys: Baseline, Harvest and Endline surveys censused all households

• Midline survey and Labor survey round 3 randomly sampled 7 households from all villages during lean season

• Other labor survey rounds also randomly sampled 7 households per village but with incomplete coverage
Data collection: Survey procedures

- Data collection via smartphone
  - Program survey into handheld device
  - Allows for
    - Real time data checking
    - Prepapulation of fields based on earlier survey rounds (e.g. household roster)
    - Population of later fields based responses earlier in same survey
    - Data collection to detect cheating (timestamps, GPS coordinates)
Results: Additional findings

Output effect driven partly by farmers cultivating less area than planned
- An effect that is decreased by the loan treatment
## Results: Additional findings

<table>
<thead>
<tr>
<th>Daily wage:</th>
<th>Individual</th>
<th>Village median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any loan treatment</td>
<td>1.990*</td>
<td>2.102*</td>
</tr>
<tr>
<td></td>
<td>(1.098)</td>
<td>(1.150)</td>
</tr>
<tr>
<td>By treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>1.920</td>
<td>2.557*</td>
</tr>
<tr>
<td></td>
<td>(1.493)</td>
<td>(1.538)</td>
</tr>
<tr>
<td>Maize</td>
<td>2.063</td>
<td>1.628</td>
</tr>
<tr>
<td></td>
<td>(1.282)</td>
<td>(1.341)</td>
</tr>
<tr>
<td>Cash loan = maize loan (p-val)</td>
<td>0.200</td>
<td>0.098</td>
</tr>
<tr>
<td>Baseline mean</td>
<td>15.621</td>
<td></td>
</tr>
</tbody>
</table>

Wages increase in treatment villages by around K2 or 12.8%
Results: Additional findings

Sub-treatments:

• Early notification:
  • No significant impact on main outcomes
  • Possibly because it was implemented only in year 2

• Cash-only repayment
  • Similar uptake and repayment rates
  • Much more cost-effective
Measurement: Self-reporting bias

- Main outcome measures are collected by survey → self-reported
  - Concern: If treatment households are more inclined to give favorable responses, then result might just be self-reporting bias, not real results
  - Investigating the concern:
    1. Collect data on a “social desirability index” and compare across treatment and control groups
    2. Collect objective agricultural output data and test whether it is better correlated with self-reported outcomes in treatment vs control groups
### Measurement: Self-reporting bias

<table>
<thead>
<tr>
<th></th>
<th>A. Social desirability bias</th>
<th>B. Self-reported maize yields</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Labor survey</td>
<td>Year 1</td>
</tr>
<tr>
<td>Any loan treatment</td>
<td>-0.041</td>
<td>-31.009</td>
</tr>
<tr>
<td></td>
<td>(0.143)</td>
<td>(123.080)</td>
</tr>
<tr>
<td>Control group mean</td>
<td>21.639</td>
<td>0.775**</td>
</tr>
<tr>
<td></td>
<td>(0.099)</td>
<td>(0.384)</td>
</tr>
<tr>
<td>Loan treatment x</td>
<td></td>
<td>0.150</td>
</tr>
<tr>
<td>Objective measure</td>
<td></td>
<td>(0.623)</td>
</tr>
<tr>
<td>Control group mean</td>
<td>563.367</td>
<td>563.367</td>
</tr>
</tbody>
</table>
Future research questions

1. What are the returns to capital at different points during the agricultural season?
   - Do farmers benefit more if they receive a loan at planting, during the hungry season or at harvest?
   - For relatively small loans, each point during the season has clear up-side

2. What other approaches might effectively smooth seasonal variability?
   - Would savings accounts or better storage be a cheaper and equally effective solution? What about crop diversification?