The Adoption and Impact of Mobile Money in Kenya: Results from a Panel Survey

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Household Survey

- 3,000 households
- Rural and a lot of urban and semi urban
- 3 rounds (so far) — 2008, 2009, 2010
- Non-negligible attrition, but not bad for this kind of survey
## M-PESA Use

<table>
<thead>
<tr>
<th></th>
<th>M-PESA Non-users</th>
<th>M-PESA users</th>
<th>All households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Round 1: 2008</td>
<td>1,685</td>
<td>1,315</td>
<td>3,000</td>
</tr>
<tr>
<td></td>
<td>0.56</td>
<td>0.44</td>
<td>1.00</td>
</tr>
<tr>
<td>Round 2 respondents in 2008</td>
<td>1,143</td>
<td>873</td>
<td>2,016</td>
</tr>
<tr>
<td></td>
<td>0.57</td>
<td>0.43</td>
<td>1.00</td>
</tr>
<tr>
<td>Round 2: 2009</td>
<td>629</td>
<td>1,387</td>
<td>2,016</td>
</tr>
<tr>
<td></td>
<td>0.31</td>
<td>0.69</td>
<td>1.00</td>
</tr>
</tbody>
</table>
Growth of Users

Share of households reporting at least one user of M-PESA
Growth of Agents
Note that agents were only sampled in administrative locations where our HH sample is
Improving Agent Access

Distance to the closest agent (km)

- 22% Change
- 40% Change
- 28% Change
- 14% Change
- 33% Change

Percentiles of the Distance to the Closest Agent

- Mean Distance
- 5th Percentile
- 25th Percentile
- 50th Percentile
- 75th Percentile

Round 1
Round 2
## Improving Agent Service

<table>
<thead>
<tr>
<th></th>
<th>Round1 (closest agent)</th>
<th>Round2 (last two transactions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unable to withdraw money</td>
<td>16%</td>
<td>5%</td>
</tr>
<tr>
<td>Unable to deposit money</td>
<td>7%</td>
<td>4%</td>
</tr>
<tr>
<td>Asked by agent to show ID</td>
<td>77%</td>
<td>95%</td>
</tr>
<tr>
<td>Trust agent</td>
<td>65%</td>
<td>95%</td>
</tr>
</tbody>
</table>
Reaching Out

Share of each quartile who are M-PESA users

- Poor: 20% (2008), 40% (2009)
- Rich: 80% (2008), 100% (2009)

Graph showing the increasing share of M-PESA users across quartiles from 2008 to 2009.
Reaching Down

Share of all M-PESA users from each quartile

Uniform use across income distribution
## Reaching Women

**User shares by gender**

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women</td>
<td>14.7%</td>
<td>40.2%</td>
</tr>
<tr>
<td>Men</td>
<td>24.9%</td>
<td>51.1%</td>
</tr>
</tbody>
</table>

**Share of all M-PESA users by gender**

![Graph showing the share of M-PESA users by gender for 2008 and 2009, with a significant increase in women's share from 14.7% to 40.2% and a decrease in men's share from 24.9% to 51.1%.]
Increased Penetration

Share of each group who are users

- Rural: 2008 (20%), 2009 (40%)
- Urban: 2008 (40%), 2009 (80%)
- Unbanked: 2008 (20%), 2009 (40%)
- Banked (2008 and 2009 data not shown)

2009 data is twice the 2008 data for rural and unbanked categories.
Expansion to Non-Bank-Savers

A graph shows the probability of saving with a bank. The x-axis represents the probability, ranging from 0 to 1. The y-axis represents non-users of M-PESA, with a transition observed from 2008 to 2009.
Bank Saving by M-PESA User Status

Share of households who use a bank account to save

- Non-users
- Users
- All hhlds

2008:
- Non-users: 80%
- Users: 40%
- All hhlds: 60%

2009:
- Non-users: 20%
- Users: 40%
- All hhlds: 0%
# Internal Remittances in Kenya

## Shares of households making remittances

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th></th>
<th>2009</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Send</td>
<td>Receive</td>
<td>Send</td>
<td>Receive</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>46%</td>
<td>38%</td>
<td>49%</td>
<td>45%</td>
</tr>
<tr>
<td><strong>By geographic location</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>34% &lt;</td>
<td>36%</td>
<td>36% &lt;</td>
<td>45%</td>
</tr>
<tr>
<td>Urban</td>
<td>55% &gt;</td>
<td>40%</td>
<td>58% &gt;</td>
<td>46%</td>
</tr>
<tr>
<td><strong>By M-PESA use</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-user</td>
<td>32%</td>
<td>26%</td>
<td>17%</td>
<td>19%</td>
</tr>
<tr>
<td>User</td>
<td>65%</td>
<td>54%</td>
<td>63%</td>
<td>58%</td>
</tr>
</tbody>
</table>

- Suggestive of net urban-rural flow?
- M-PESA $\rightarrow$ remittances, or remittances $\rightarrow$ M-PESA?
M-PESA Adoption and Remittances

**Share who send money**

- Round 1: 0.4
- Round 2: 0.6

**Share who receive money**

- Round 1: 0.3
- Round 2: 0.7

- **Never**
- **Late**
- **Early**
Frequency of M-PESA Use

- Daily: 40% (2008), 40% (2009)
- Weekly: 20% (2008), 20% (2009)
- Every 2 Weeks: 10% (2008), 10% (2009)
- Monthly: 30% (2008), 40% (2009)
- Every 3 Months: 20% (2008), 20% (2009)
- Every 6 Months: 0% (2008), 10% (2009)
- Less Often: 0% (2008), 10% (2009)
How Households Save

- 100%
- 80%
- 60%
- 40%
- 20%
- 0%

2008
2009
Primary Savings Vehicles

Most important saving instrument

2008:
- Bank: 50%
- Mattress: 24%
- M-PESA: 7%
- ROSCA: 10%
- Other: 9%

2009:
- Bank: 47%
- Mattress: 22%
- M-PESA: 16%
- ROSCA: 10%
- Other: 5%
Supplemental Savings

Second most important saving instrument

By 2009, half of all households said M-PESA was one of their two most important savings instrument

2008

- Other: 24%
- M-PESA: 21%
- ROSCA: 16%
- Bank: 9%
- Mattress: 30%

2009

- Other: 17%
- M-PESA: 33%
- ROSCA: 16%
- Bank: 11%
- Mattress: 23%
Risk Spreading

• Many Kenyans are exposed to high levels of uncertainty
  – Crop failure, Health shocks, Job loss, etc.

• We find that general consumption and food in particular fluctuate with income

• But, M-PESA users are better able to protect themselves and to reduce fluctuations in consumption. True for
  – Households with users (difference in difference)
  – Households who live close to M-PESA agents (reduced form DID),
  – Both (triple difference)
## Basic Difference in Difference Results

<table>
<thead>
<tr>
<th></th>
<th>No Controls</th>
<th>Some Controls</th>
<th>All Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-PESA User</td>
<td>0.506***</td>
<td>0.493***</td>
<td>0.086***</td>
</tr>
<tr>
<td>Strong Negative Shock</td>
<td>-0.317***</td>
<td>-0.181***</td>
<td>-0.404***</td>
</tr>
<tr>
<td>M-PESA User x Strong Negative</td>
<td>0.215***</td>
<td>0.146***</td>
<td>0.148***</td>
</tr>
<tr>
<td>Positive Shock</td>
<td>0.047</td>
<td>0.148*</td>
<td>0.299</td>
</tr>
<tr>
<td>M-PESA User x Strong Positive</td>
<td>0.016</td>
<td>-0.031</td>
<td>-0.079</td>
</tr>
</tbody>
</table>

| Overall Effect of Negative Shock for Users | -0.102*** [0.037] | -0.035 [0.030] | 0.001 [0.024] |
| Overall Effect of Negative Shock for Non-Users | -0.317 *** [0.038] | -0.181*** [0.034] | -0.072*** [0.027] |
| Overall Effect of Negative Shock | -0.197*** [0.029] | -0.099*** [0.023] | -0.0312* [0.019] |

All regressions include a time dummy. Some controls include household demographics. All controls adds the use of various other financial instruments, wealth, years of education, other education dummies and the interactions of all these controls with each of positive and negative shocks. Standard errors in brackets where reported. *** p<0.01, ** p<0.05, * p<0.1.
Basic Difference in Difference Results

• M-PESA improves the ability to weather serious negative economic shocks

• Negative shocks cause non-users of M-PESA to reduce their consumption by about 7% (see column 3)

• However, M-PESA users can smooth these shocks perfectly
  – Some of this comes from the fact that users are wealthier, more educated, etc.
  – But, M-PESA itself is a significant source of risk spreading (see the coefficients reported in row 3)

• Find similar, indeed somewhat stronger, results for food consumption
## Looking at Food Consumption

<table>
<thead>
<tr>
<th>Dependent Variable: Log of Per Capita Household Food Consumption</th>
<th>No Controls</th>
<th>All Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-PESA User</td>
<td>0.276***</td>
<td>0.022</td>
</tr>
<tr>
<td>Strong Negative Shock</td>
<td>-0.254***</td>
<td>-0.188</td>
</tr>
<tr>
<td>M-PESA User x Strong Negative Shock</td>
<td>0.174***</td>
<td>0.107***</td>
</tr>
<tr>
<td>Strong Positive Shock</td>
<td>0.041</td>
<td>0.265</td>
</tr>
<tr>
<td>M-PESA User x Strong Positive Shock</td>
<td>-0.070</td>
<td>-0.102</td>
</tr>
</tbody>
</table>

### Overall Effect of Negative Shock

- **Users**:
  - No Controls: -0.080***
  - All Controls: -0.004
- **Non-Users**:
  - No Controls: -0.254***
  - All Controls: -0.063***
- **Overall**:
  - No Controls: -0.157***
  - All Controls: -0.030*

*All regressions include a time dummy. Some controls include household demographics. All controls adds the use of various other financial instruments, wealth, years of education, other education dummies and the interactions of all these controls with each of positive and negative shocks. Standard errors in brackets where reported. *** p<0.01, ** p<0.05, * p<0.1.*
Conclusion

• M-PESA use has expanded down the income distribution, across the gender divide, and out to the rural areas

• The agent network has deepened and widened, improving access

• Use of M-PESA as a savings instrument has increased

• We also find that M-PESA significantly improves the ability of households in Kenya to smooth risks