Mobile Banking in Tanzania

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Mobile banking in Africa and other developing regions

- Many households do not have traditional bank accounts
- A new bank account can be created and attached to a mobile phone number
  - and therefore to a mobile telecom network
- Each mobile network creates its own money
- Mobile banking networks are incompatible
- When are two mobile telecom companies, A, B, in a country, there are three types of money: State (S-) money, A- m-money, and B- m-money
De facto lack on interoperability makes exchange rates crucial.
In Tanzania:

- Conversion from S-money to A- or B- m-money ("cashing in") is free
- Conversion from A- or B- m-money to S-money ("cashing out") is expensive: fee 2.5% for an average transaction
- Transfer across networks, from A- money to B- money is even more expensive, fee 2.8% for average transactions
- Transfer within a network has a low fee, 0.3% for average transactions
In Tanzania 35% of households have at least one m-money account

- three major m-banking networks
  - Vodacom (Vodafone), 53% market share in m-money
  - Tigo, 18%
  - Airtel, 13%

- Calling and transferring money across networks is expensive, so many consumers have a different phone or a different SIM for each network

- Tigo advertises phones that take multiple SIMs
M-money is most frequently used to send or receive remittances

- Non-remittance transfers are infrequent
  - 14% of all households made or received a non-remittance payment in the past six months using any type of cash delivery, including m-money
  - The most common types of payments included school fees, government fees and taxes, utility bills, and salaries
Despite the zero interest rate

- Half of consumers with m-money accounts use their account as a savings account
- 21% Vodacom M-Pesa users and 12% of users of Tigo & Airtel use m-money for business transactions
Cashing in and cashing out of m-money

- is done through a network of fixed and roaming agents that act as ATM machines
- This is the main cost of the banking networks
Data

3 months of banking transactions from Tigo Tanzania
- Cash-in, Cash-out, Recharge mobile, Transfer, Check balance

Balance, operation size, GPS location, fee

During the period, there was an unanticipated price change in transfer and cash-out transactions
Tanzania
Frequency of transfers
Transfer network
Model

- Each day user i has a need to at most 3 peer-to-peer transfers
- Every user has one transfer need for sure
- Subsequent needs are determined by p-coin-tosses
- Utility from n-th mobile transfer of size “f” is given by 
  \[ u_{fin} = F_f - \alpha \times p_f + \epsilon_{fin} \]
- Transfer distance is distributed as an exponential RV
- Utility of the outside option (bus driver, cash) is a decreasing function of the distance of the transfer 
  \[ u_{0in} = \beta \times d_{in} + \epsilon_{0in} \]
Implementation

- We assume that three months of data identifies all the potential users of mobile money.
- We estimate the model one week before and one week after the price change, and use day dummies to net out time trends.
- The selection of transfers by distance is identified from a differential response to the price change.
- We assume that utility shocks $\epsilon$ are distributed type-1 extreme value, and that distance is distributed as exponential.
- We estimate the model with a full information MLE.
Results

- Price coefficient is -0.113
- Mean latent distance is 25km
- Distance coefficient is -0.11
- People have relatively large price aversion
- The demand for short distance transfers is more price-elastic
Conclusion

- Preliminary results suggest that the increase in transfer price lowered the usage of mobile money preventing transfers at closer locations.

- Long distance transfers internalize the transaction cost increase.

- Next step: separate the impact of the cash out fee and add persistent consumer heterogeneity.