Mobile Money and Monetary Policy

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Outline

Motivation: Mobile Money and Monetary Policy


Mobile money in the Anand and Prasad model

Policy implications
Punchlines

- Financial frictions ⇒ supply shocks favour targeting headline vs. core inflation, especially with mostly rural population
- Mobile money ⇒ reduced volatility of all important variables
- Gains mostly to rural households
Is mobile money a threat to the conduct of monetary policy?

The Implications of Innovations in the Financial Sector on the Conduct of Monetary Policy in East Africa


By 2011:

- 70% of households use regularly use mobile money
- 18m registered users (compared to 1.4m with ATM cards)

“...we conclude that the monetary implications of mobile money are currently minimal in Kenya. However...the developments and innovations in this space could fuel the growth of mobile money such that it reaches levels where it could have implications for monetary policy“
The demise of money-based frameworks?

- Effective reserve-money targeting as practiced in East Africa relies on:
  - predictability in the velocity of circulation of broad money (private sector demand behaviour)
  - predictability in the money multiplier (the policy control / transmission mechanism)

- Instability $\Rightarrow$ simple relationship between money and inflation difficult to predict.

- Financial liberalization and innovation $\Rightarrow$ end of money targeting in OECD... Is it doing the same in East Africa?
Mobile money a threat to the conduct of monetary policy?

- Central banks have expressed concern that these new technologies undermine the efficacy of monetary policy as conventionally conducted.
An East African transition towards IT frameworks

- East African Countries moving rapidly to IT-based frameworks
  - Uganda, formal commitment to ‘IT-Lite’ in July 2011 with target of 5% for core inflation
  - Kenya, formal commitment to an inflation target of 5% (+/-2.5%) for headline inflation
  - In other EAC countries, commitment to keep headline inflation in stable single digits
  - All central banks actively moving towards frameworks that can steer short-term market rates into a closer relationship with the policy interest rates (‘bank rate’)
The conventional wisdom

- Demand shock: \( \uparrow \) inflation, \( \uparrow \) output (or vice versa)

- Supply shock: \( \uparrow \) inflation, \( \downarrow \) output (or vice versa).

- If supply shocks dominate strict IT exacerbates output volatility
Implications for LICs

▶ **Conventional IT solution**: target core inflation; accommodate non-core price shocks (but not second-round effects)

▶ But if these are frequent and large an IT regime targeting core inflation allows high volatility in headline inflation.

▶ **General result**: the broader the measure of inflation you seek to stabilize, the greater will be output volatility... Other (i.e. fiscal) policy instruments to stabilize output?
Why supply shocks are likely to dominate in LICs

The Food Engel curve

Share of food in total consumption

Source: USDA Economic Research Service
Supply shocks dominate in LICs

Correlation between output gap and inflation: demand shocks \( \Rightarrow \rho > 0 \), supply shocks: \( \Rightarrow \rho < 0 \)

Correlation between real GDP and inflation

HP-filtered variables. All countries with 17 or more yrs of data starting in 1990.
Source: Adam et al. (2010).
Anand and Prasad (2010): countering the conventional wisdom for emerging market economies


- Adapt conventional New-Keynesian model to dualistic setting:
  - ‘Food-producing’/rural households: hand-to-mouth/Keynesian consumers
  - ‘Non-food-producing’/urban households can borrow/save

- Monetary policy transmission through consumption Euler equation for urban households.
Anand and Prasad (2010): key results and intuition

- With incomplete markets, targeting core inflation may not be optimal. Flexible headline inflation targeting generally dominates.

- Absence of financial markets means that relative price shocks in the food (flex-price) sector have direct income effects for credit constrained households.

- \( \Rightarrow \) aggregate demand effect which does not respond to conventional demand-side policy responses.

- Our research question: how robust are these findings when we allow for mobile money technology in this class of model?
Adding mobile money transfers to Anand and Prasad (2010)
Urban HHs’ demand for composite consumption good ($C_t^s$):

\[
(C_t^s)^{-\sigma} = \beta \mathbb{E}_t \left[ (C_{t+1}^s)^{-\sigma} \frac{R_t}{\Pi_t} \right]
\]  \hspace{1cm} (1)

$\beta$: discount factor
$R_t$: Gross nominal interest rate
$\Pi_t$: Gross inflation rate
$\sigma$: inverse of elasticity of intertemporal substitution
Rural households

Rural HHs’ demand for composite consumption good \( (C_t^f) \):

\[
C_t^f = x_{f,t} y_{f,t} - x_{f,t} C^* + \frac{m_t}{1 + \mu}
\]  

\( x_{f,t} \): relative price of food
\( y_{f,t} \): food production
\( C^* \): subsistence consumption level
\( m_t \): remittances
\( \mu \): remittance ‘melt’ rate
Remittances

Remittance payment:

\[ m_t = \bar{m}e^{-\kappa\left(\frac{\Omega_t}{\bar{\Omega}} - 1\right)} \]  \hspace{1cm} (3)

- \( m_t \): remittances
- \( \bar{m} \): steady-state \( m_t \)
- \( \Omega_t \): rural HHs’ pre-remittance income net of subsistence consumption
- \( \bar{\Omega} \): steady-state \( \Omega_t \)
- \( \kappa \): elasticity of \( m_t \) w.r.t. \( \Omega_t \)
Interest rate rule

\[ \log \left( \frac{R_t}{R} \right) = \rho_i \log \left( \frac{R_{t-1}}{R} \right) + \rho_\pi \log \left( \frac{\Pi_t}{\bar{\Pi}} \right) + \rho_y \log \left( \frac{Y_t}{\bar{Y}} \right) \]  

(4)

- \( R_t \): Gross nominal interest rate
- \( \Pi_t \): Gross headline or core inflation rate
- \( Y_t \): GDP
- \( \rho_i = 0.7 \), \( \rho_\pi = 2 \), \( \rho_y = 1 \)
Experiments

1. Targeting headline inflation vs. core inflation
2. Three remittance set-ups:
   - ‘No remittances’: remittances fixed at steady-state level
   - ‘Constrained remittances’: $\frac{1}{2}$ elasticity w.r.t. rural incomes, 20% ‘melt’
   - ‘Mobile money’: unit elasticity w.r.t. rural incomes, no ‘melt’
Proportional change in std. deviations: headline- over core-inflation-targeting, food shock

NR = no remittances, CR = constrained remittances, MM = mobile money

<table>
<thead>
<tr>
<th>Remittance set-up</th>
<th>NR</th>
<th>CR</th>
<th>MM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headline inflation</td>
<td>-29%</td>
<td>-20%</td>
<td>-13%</td>
</tr>
<tr>
<td>Core inflation</td>
<td>-32%</td>
<td>-14%</td>
<td>2%</td>
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<tr>
<td>GDP</td>
<td>-32%</td>
<td>-8%</td>
<td>84%</td>
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<tr>
<td>Nominal int. rate</td>
<td>48%</td>
<td>93%</td>
<td>218%</td>
</tr>
<tr>
<td>Rural cons.</td>
<td>-9%</td>
<td>-5%</td>
<td>-3%</td>
</tr>
<tr>
<td>Urban cons.</td>
<td>4%</td>
<td>8%</td>
<td>16%</td>
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Proportional change in std. deviations: CR/MM over NR, food shock

NR = no remittances, CR = constrained remittances, MM = mobile money

<table>
<thead>
<tr>
<th>Inflation target</th>
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<th>Core</th>
<th></th>
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<td>CR</td>
<td>MM</td>
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<td>MM</td>
</tr>
<tr>
<td>Headline inflation</td>
<td>-16%</td>
<td>-32%</td>
<td>-25%</td>
<td>-44%</td>
</tr>
<tr>
<td>Core inflation</td>
<td>-10%</td>
<td>-21%</td>
<td>-29%</td>
<td>-47%</td>
</tr>
<tr>
<td>GDP</td>
<td>-30%</td>
<td>-51%</td>
<td>-48%</td>
<td>-82%</td>
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<tr>
<td>Nominal int. rate</td>
<td>-25%</td>
<td>-48%</td>
<td>-43%</td>
<td>-76%</td>
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<tr>
<td>Rural cons.</td>
<td>-37%</td>
<td>-73%</td>
<td>-39%</td>
<td>-74%</td>
</tr>
<tr>
<td>Urban cons.</td>
<td>-34%</td>
<td>-64%</td>
<td>-37%</td>
<td>-68%</td>
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**Std. deviations by regime × 10, food shock**

NR = no remittances, CR = constrained remittances, MM = mobile money

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<tr>
<td>Remittance set-up</td>
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<tr>
<td>Headline inflation</td>
<td>0.4229</td>
<td>0.3558</td>
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<tr>
<td>Core inflation</td>
<td>0.0160</td>
<td>0.0144</td>
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<tr>
<td>GDP</td>
<td>0.2336</td>
<td>0.1638</td>
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<tr>
<td>Nominal int. rate</td>
<td>1.0926</td>
<td>0.8148</td>
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<tr>
<td>Rural cons.</td>
<td>2.0488</td>
<td>1.2908</td>
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<tr>
<td>Urban cons.</td>
<td>2.1881</td>
<td>1.4333</td>
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<td>MM</td>
<td>NR</td>
<td>CR</td>
<td>MM</td>
</tr>
<tr>
<td>Headline inflation</td>
<td>0.3127</td>
<td>0.3129</td>
<td>0.3129</td>
<td>0.3140</td>
<td>0.3136</td>
<td>0.3131</td>
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<tr>
<td>Core inflation</td>
<td>0.3219</td>
<td>0.3204</td>
<td>0.3185</td>
<td>0.3209</td>
<td>0.3197</td>
<td>0.3182</td>
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<tr>
<td>GDP</td>
<td>0.5249</td>
<td>0.5184</td>
<td>0.5093</td>
<td>0.5326</td>
<td>0.5234</td>
<td>0.5121</td>
</tr>
<tr>
<td>Nominal int. rate</td>
<td>0.3133</td>
<td>0.3317</td>
<td>0.3580</td>
<td>0.3286</td>
<td>0.3488</td>
<td>0.3739</td>
</tr>
<tr>
<td>Rural cons.</td>
<td>0.7200</td>
<td>0.4731</td>
<td>0.2132</td>
<td>0.7306</td>
<td>0.4777</td>
<td>0.2143</td>
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<tr>
<td>Urban cons.</td>
<td>0.2824</td>
<td>0.5747</td>
<td>0.9256</td>
<td>0.2866</td>
<td>0.5803</td>
<td>0.9305</td>
</tr>
</tbody>
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Policy implications

- No threat to effective conduct of monetary policy with move from reserve-money targeting to IT
- Mobile money use $\Rightarrow$ macroeconomic stability, encourage further spread
- A possible case for targeting core inflation
Punchlines

- Financial frictions $\Rightarrow$ supply shocks favour targeting headline vs. core inflation, especially with mostly rural population
- Mobile money $\Rightarrow$ reduced volatility of all important variables
- Gains mostly to rural households