

Mobile Money and Monetary Policy

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Outline

Motivation: Mobile Money and Monetary Policy

An alternative framework: Anand and Prasad (2010)

Mobile money in the Anand and Prasad model

Policy implications

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

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

David Weil, Isaac Mbiti, Francis Mwega (IGC WP, 2013).

By 2011:

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

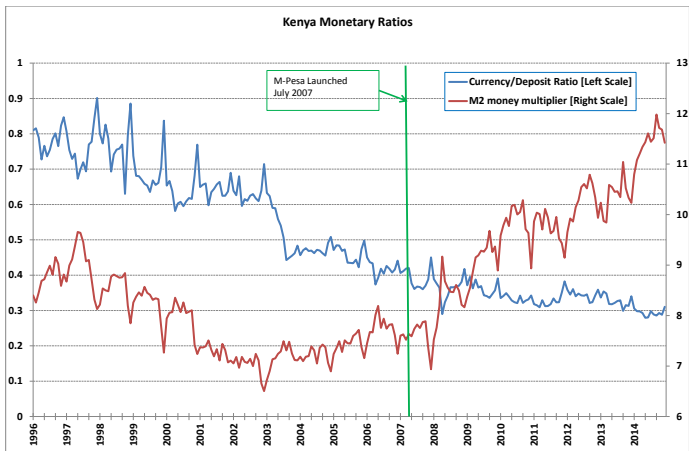
“...we conclude that the monetary implications of mobile money are currently minimal in Kenya. However...the developments and innovations in this space could fuel the growth of mobile money such that it reaches levels where it could have implications for monetary policy“

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

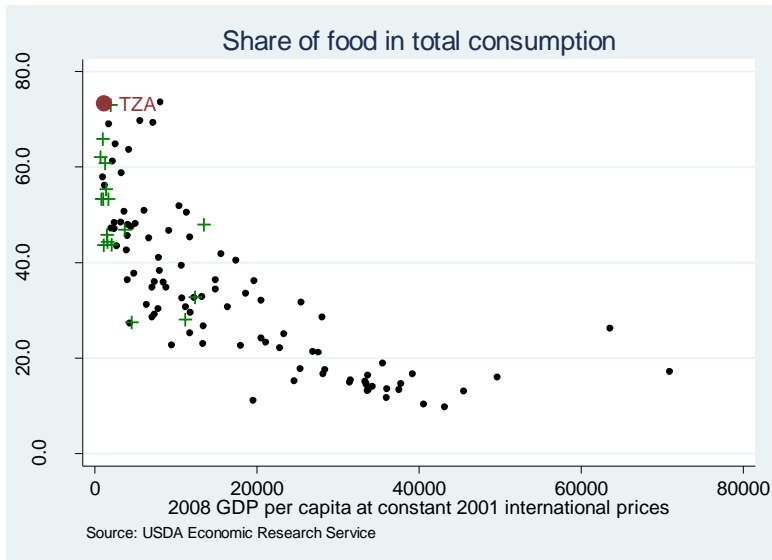
- ▶ Demand shock: \uparrow inflation, \uparrow output (or vice versa)'
- ▶ Supply shock: \uparrow inflation, \downarrow output (or vice versa).
- ▶ If supply shocks dominate strict IT exacerbates output volatility

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

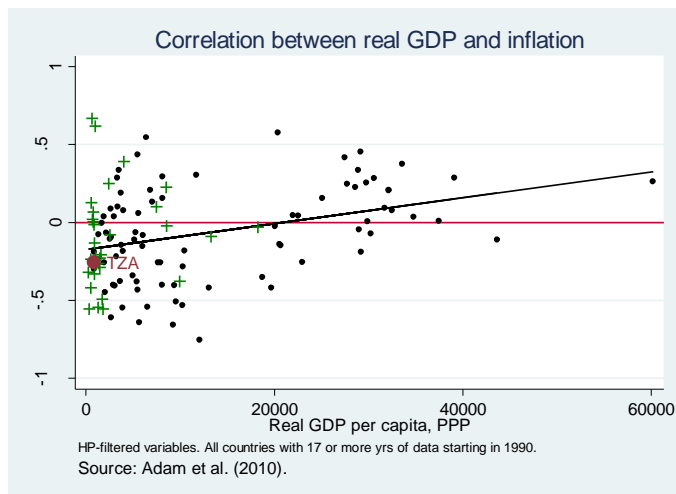
The Food Engel curve



Supply shocks dominate in LICs

Correlation between output gap and inflation: demand shocks

$\Rightarrow \rho > 0$, supply shocks: $\Rightarrow \rho < 0$



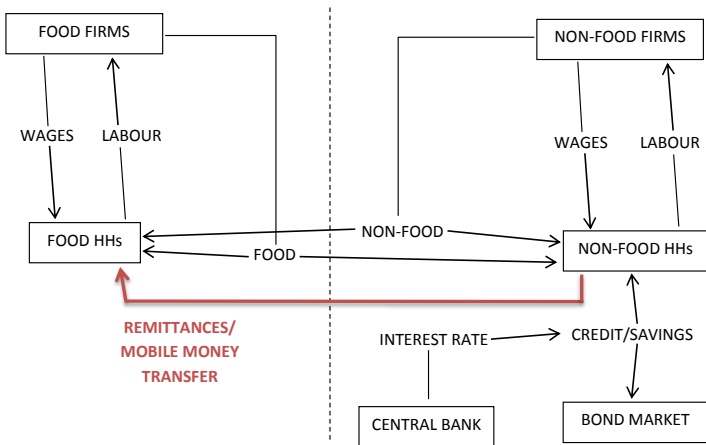
Anand and Prasad (2010): countering the conventional wisdom for emerging market economies

- ▶ *Optimal Price Indices for Targeting Inflation Under Incomplete Markets* **Rahul Anand and Eswar Prasad** (IMF WP 20/200)
- ▶ 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
- ▶ => 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 households

Urban HHs' demand for composite consumption good (C_t^s):

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

β : discount factor

R_t : Gross nominal interest rate

Π_t : Gross inflation rate

σ : inverse of elasticity of intertemporal substitution

Rural households

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

$$C_t^f = x_{f,t}y_{f,t} - x_{f,t}C^* + \frac{m_t}{1 + \mu} \quad (2)$$

$x_{f,t}$: relative price of food

$y_{f,t}$: food production

C^* : subsistence consumption level

m_t : remittances

μ : remittance 'melt' rate

Remittances

Remittance payment:

$$m_t = \bar{m} e^{-\kappa \left(\frac{\Omega_t}{\bar{\Omega}} - 1 \right)} \quad (3)$$

m_t : remittances

\bar{m} : steady-state m_t

Ω_t : rural HHs' pre-remittance income net of subsistence consumption

$\bar{\Omega}$: steady-state Ω_t

κ : elasticity of m_t w.r.t. Ω_t

Interest rate rule

$$\log\left(\frac{R_t}{\bar{R}}\right) = \rho_i \log\left(\frac{R_{t-1}}{\bar{R}}\right) + \rho_\pi \log\left(\frac{\Pi_t}{\bar{\Pi}}\right) + \rho_y \log\left(\frac{Y_t}{\bar{Y}}\right) \quad (4)$$

R_t : Gross nominal interest rate

Π_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

Remittance set-up	NR	CR	MM
Headline inflation	-29%	-20%	-13%
Core inflation	-32%	-14%	2%
GDP	-32%	-8%	84%
Nominal int. rate	48%	93%	218%
Rural cons.	-9%	-5%	-3%
Urban cons.	4%	8%	16%

Proportional change in std. deviations: CR/MM over NR, food shock

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

Inflation target	Headline		Core	
	CR	MM	CR	MM
Remittance set-up				
Headline inflation	-16%	-32%	-25%	-44%
Core inflation	-10%	-21%	-29%	-47%
GDP	-30%	-51%	-48%	-82%
Nominal int. rate	-25%	-48%	-43%	-76%
Rural cons.	-37%	-73%	-39%	-74%
Urban cons.	-34%	-64%	-37%	-68%

Std. deviations by regime $\times 10$, food shock

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

Inflation target	Headline			Core		
	NR	CR	MM	NR	CR	MM
Remittance set-up						
Headline inflation	0.4229	0.3558	0.2874	0.5944	0.4453	0.3313
Core inflation	0.0160	0.0144	0.0126	0.0234	0.0167	0.0124
GDP	0.2336	0.1638	0.1148	0.3446	0.1787	0.0624
Nominal int. rate	1.0926	0.8148	0.5718	0.7405	0.4230	0.1797
Rural cons.	2.0488	1.2908	0.5619	2.2502	1.3632	0.5784
Urban cons.	2.1881	1.4333	0.7857	2.1079	1.3331	0.6794

Std. deviations by regime $\times 100$, non-food shock

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

Inflation target	Headline			Core		
	NR	CR	MM	NR	CR	MM
Remittance set-up						
Headline inflation	0.3127	0.3129	0.3129	0.3140	0.3136	0.3131
Core inflation	0.3219	0.3204	0.3185	0.3209	0.3197	0.3182
GDP	0.5249	0.5184	0.5093	0.5326	0.5234	0.5121
Nominal int. rate	0.3133	0.3317	0.3580	0.3286	0.3488	0.3739
Rural cons.	0.7200	0.4731	0.2132	0.7306	0.4777	0.2143
Urban cons.	0.2824	0.5747	0.9256	0.2866	0.5803	0.9305

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

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- ▶ Mobile money \Rightarrow reduced volatility of all important variables
- ▶ Gains mostly to rural households