

Monetary Growth Rules in an Emerging Open Economy

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The 1-slide pitch

- We study the nature of monetary policy transmission in emerging economies
- Which type of policy rules can successfully stabilize this type of economies?
- We develop (and estimate) a 2-bloc (ROW + SOE) DSGE model with several relevant features:
 - Nominal frictions (prices and wages)
 - LAMP (Limited Asset Market Participation)
 - Informality
 - Incomplete exchange-rate pass-through
 - Commodity exports dependence
- Money growth rule to overcome (in)stability and (in)determinacy issues with traditional interest rate rules (framework for Islamic monetary policy?)
- Informality dampens shocks, openness exacerbates 'foreign' shocks, LAMP amplifies the effect of several shocks, but attenuates monetary policy ones

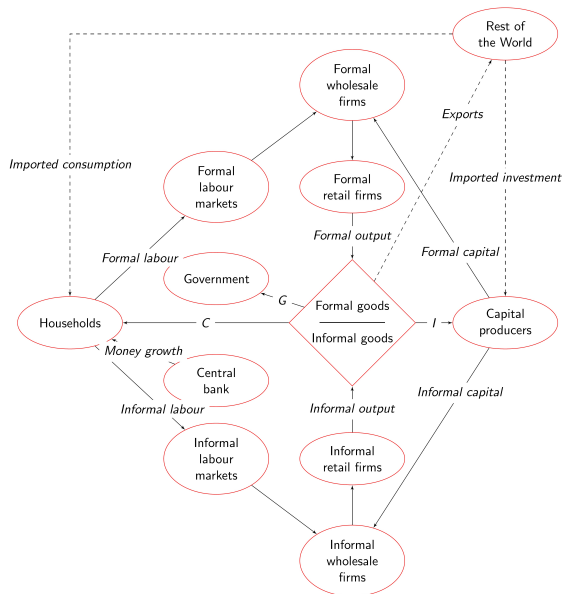
We bring together different strands in the literature that have hitherto remained disparate

- The role of informality (Montoro, 2010, Batini et al., 2011, Gabriel et al., 2012 and Khera, 2016)
- Financial frictions and limited asset-markets participation (Bilbiie, 2008 and Boerma, 2014)

Adequacy of a money growth rule

- LAMP has an impact on the efficacy of interest rate rule-based monetary policy and significantly distorts the saddle-path stability of traditional Taylor rules: inverted aggregate demand logic!
- Money growth rules delivers stability and determinacy, avoiding IADL
- Money growth rules potentially useful for monetary policy conduct under an Islamic setup

Model structure



Features

- Calvo-type price and wage stickiness
- Credit-constrained consumers
- Informality in goods and labour markets
 - Not taxed, non-traded, only consumption goods, PCP, different shocks and stickinesses
- Imperfect exchange rate path through
- Oil export sector
- Financial autarky
- Government debt and fiscal deficit

Consumption Demand

Domestic and Imported Goods

$$C_t = \left[w_C^{\frac{1}{\mu_C}} C_{H,t}^{\frac{\mu_C-1}{\mu_C}} + (1 - w_C)^{\frac{1}{\mu_C}} C_{F,t}^{\frac{\mu_C-1}{\mu_C}} \right]^{\frac{\mu_C}{\mu_C-1}}$$
$$P_t = \left[w_C (P_{H,t})^{1-\mu_C} + (1 - w_C) (P_{F,t})^{1-\mu_C} \right]^{\frac{1}{1-\mu_C}}$$

Formal and Informal Goods

$$C_{H,t} = \left[w_S^{\frac{1}{\mu_S}} C_{1,t}^{\frac{\mu_S-1}{\mu_S}} + (1 - w_S)^{\frac{1}{\mu_S}} C_{2,t}^{\frac{\mu_S-1}{\mu_S}} \right]^{\frac{\mu_S}{\mu_S-1}}$$
$$P_{H,t} = \left[w_S (P_{1,t})^{1-\mu_S} + (1 - w_S) (P_{2,t})^{1-\mu_S} \right]^{\frac{1}{1-\mu_S}}$$

Households

The Ricardian household solves

$$\max_{C_t^R, H_t^R, m_t^R} \mathbb{E}_t \left[\sum_{s=0}^{\infty} PS_t \beta^s U(C_{t+s}^R, H_{t+s}^R, m_{t+s}^R) \right]$$

s.t. nominal budget constraint

$$P_t^B B_{H,t} + P_t C_t^R + P_t m_t^R = \\ B_{H,t-1} + W_{1,t}^{nh} (1 - \tau_t^w) H_{1,t}^R + W_{2,t}^{nh} H_{2,t}^R + P_{t-1} m_{t-1}^R + \Gamma_t$$

The non-Ricardian household solves

$$\max_{C_t^{RoT}, H_t^{RoT}, m_t^{RoT}} \mathbb{E}_t \left[\sum_{s=0}^{\infty} PS_t \beta^s U(C_{t+s}^{RoT}, H_{t+s}^{RoT}, m_{t+s}^{RoT}) \right]$$

s.t. nominal budget constraint

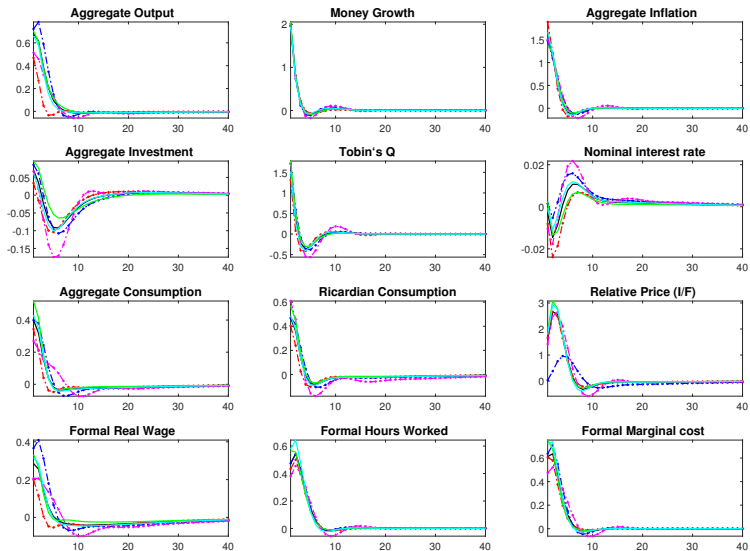
$$C_t^{RoT} = W_{1,t}^h (1 - \tau_t^w) H_{1,t}^{RoT} + W_{2,t}^h H_{2,t}^{RoT} - m_t^{RoT} + \frac{m_{t-1}^{RoT}}{\Pi_t}$$

Money Growth Rule

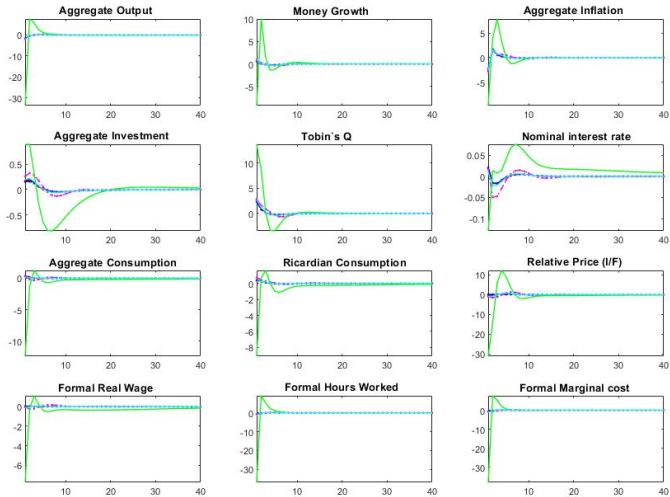
Money growth rate μ_t :

$$\begin{aligned}\log\left(\frac{\mu_t}{\mu}\right) &= \rho_\mu \log\left(\frac{\mu_{t-1}}{\mu}\right) - (1 - \rho_\mu)\left(\theta_\pi \log\left(\frac{\Pi_{1,t}}{\Pi_1}\right)\right. \\ &\quad + \theta_y \log\left(\frac{Y_{1,t}}{Y_1}\right) + \theta_{dy} \log\left(\frac{Y_{1,t}}{Y_{1,t-1}}\right) \left.) + \theta_s \log\left(\frac{\Pi_{S,t}}{\Pi_S}\right)\right. \\ &\quad + \left. \epsilon_{\mu,t}\right)\end{aligned}$$

Estimated Impulse Response to a Monetary Policy Shock



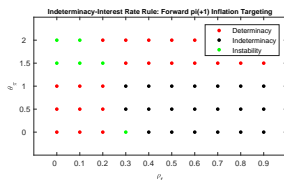
Estimated Impulse Response to an Oil Price Shock



Interest Rate Rule: Instability and Indeterminacy ($\lambda = 0.5$)



(a) $\mathbb{E}_t \log \left(\frac{\pi_{1,t}}{\pi_1} \right)$

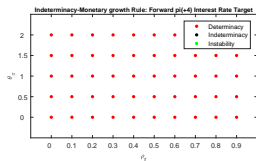


(b) $\mathbb{E}_t \log \left(\frac{\pi_{1,t+1}}{\pi_1} \right)$

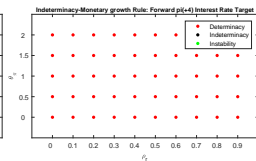


(c) $\mathbb{E}_t \log \left(\frac{\pi_{1,t+4}}{\pi_1} \right)$

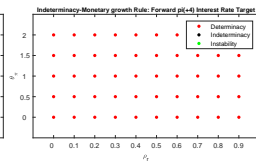
Monetary Growth Rule: Determinacy and Stability $\lambda = 0.5$



(d) $\mathbb{E}_t \log \left(\frac{\pi_{1,t}}{\bar{\pi}_1} \right)$

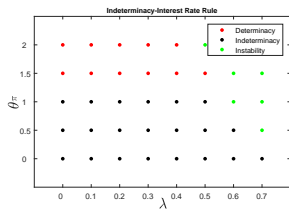


(e) $\mathbb{E}_t \log \left(\frac{\pi_{1,t+1}}{\bar{\pi}_1} \right)$

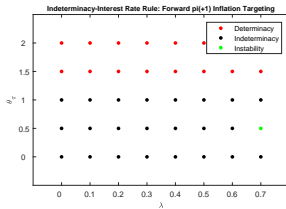


(f) $\mathbb{E}_t \log \left(\frac{\pi_{1,t+4}}{\bar{\pi}_1} \right)$

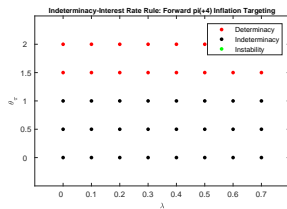
LAMP and Interest Rate Rule: Instability and Indeterminacy $\rho_r = 0$



(g) $\mathbb{E}_t \log \left(\frac{\pi_{1,t}}{\pi_1} \right)$

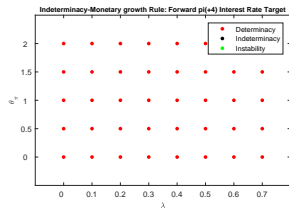


(h) $\mathbb{E}_t \log \left(\frac{\pi_{1,t+1}}{\pi_1} \right)$

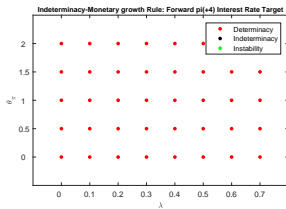


(i) $\mathbb{E}_t \log \left(\frac{\pi_{1,t+4}}{\pi_1} \right)$

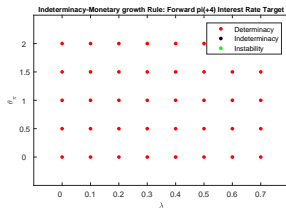
LAMP and Monetary Growth Rule: Determinacy and Stability $\rho_\mu = 0$



(j) $\mathbb{E}_t \log \left(\frac{\pi_{1,t}}{\pi_1} \right)$



(k) $\mathbb{E}_t \log \left(\frac{\pi_{1,t+1}}{\pi_1} \right)$



(l) $\mathbb{E}_t \log \left(\frac{\pi_{1,t+4}}{\pi_1} \right)$

Conclusion

- A money growth rule displays full stability and determinacy.
- Dominant role of shocks emanating from the formal sector.
- The more significant the informal sector, the more dampened cyclical variations in aggregate fluctuations become; less pertinent monetary policy.
- The higher the trade openness, the more significant the role of 'foreign' shocks (e.g. oil price, technology, terms of trade).
- The higher the share of rule-of-thumb consumers the larger the effects of several shocks, but the more attenuated the effects of monetary policy.
- Ignoring local currency pricing inflates the effects of other shocks, namely terms of trade shocks.