Discussion on 'Information and Liquidity' by Lester, Postlewaite, and Write

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What the paper is about

Money search model a la Lagos and Wright with multiple assets which differ for their liquidity

Questions:

1. What are the equilibrium liquidity properties of these assets?
2. How monetary policy can affect assets' returns, liquidity, allocation, and prices?

Results

- Monetary policy affects the return on money, **but also** the return on alternative assets that can be partial substitute for money
- In particular, if inflation increases both the liquidity premium on money and that on less liquid assets increases
- If the assets' liquidity differential is endogenous, higher inflation can increase the liquidity of assets other than money

Stripped down model

- Continuum of infinitely-lived agents and discrete time
- Each period agents participate to CM and to DM
- CM: centralized market where consumption good x is produced using labor h with $x = h$
- DM: **continuum of islands with competitive markets** where a different good q is produced at **cost** q
- Competitive markets $\rightarrow$ no hold-up problem

Stripped down model (continued)

- there are two assets:
  1. fiat money with supply M that grows at rate γ (price ϕ)
  2. trees in fixed supply A which give return δ (price ψ)

- there are two types of islands:
  1. type 1: only money accepted for trade
  2. type 2: both assets accepted for trade

- CM: arrive with $y = \phi m + (\delta + \psi) a$ and choose $(\hat{m}, \hat{a})$

- $W(y)$ = value function of agent entering CM

- $V(m, a)$ = value function of agent entering DM

Centralized Market

$$W(y) = \max_{x,h,\hat{m},\hat{a}} \{U(x) - h + \beta V(\hat{m},\hat{a})\}$$
$$s.t.\ x = h + y - \phi\hat{m} - \psi\hat{a} - T$$

FOC:

$$U'(x) = 1$$
$$\phi \geq \beta V_1(\hat{m},\hat{a}), \text{ with} = \text{if } \hat{m} > 0$$
$$\psi \geq \beta V_2(\hat{m},\hat{a}), \text{ with} = \text{if } \hat{a} > 0$$

Result: $W(y) = k + y$ **for some** $k > 0$

Decentralized Market

Seller in island i:

$$\max_{q_i} -q_i + W(\tilde{y} + p_i q_i)$$

Buyer in island i:

$$\max_{q_i} u(q_i) + W(y - p_i q_i)$$
$$s.t.\ p_i q_i \leq y_i$$

where $y_1 = \phi m$ and $y_2 = \phi m + (\delta + \psi) a$

Hence:

$$p_1 = p_2 = 1 \text{ and } q_i = \begin{cases} q^* \text{ if } y_i \geq q^* \\ y_i \text{ if } y_i < q^* \end{cases}$$

where $q^* = u'^{-1}(1)$

Decentralized Market (continued)

$$V(m,a) = \lambda_0 W(y) + \lambda_1 [u(q_1) + W(y - q_1)] + \lambda_2 [u(q_2) + W(y - q_2)]$$

Hence:

$$\begin{aligned} V_1(m,a) &= \phi \left[1 + \lambda_1 \left(u'(q_1) - 1\right) + \lambda_2 \left(u'(q_2) - 1\right)\right] \\ V_1(m,a) &= (\delta + \psi) \left[1 + \lambda_2 \left(u'(q_2) - 1\right)\right] \end{aligned}$$

- $u'(q_i) - 1$ represents the **liquidity premium** associated to assets traded in islands of type i
- Notice that $u'(q_i) = 1$ iff $y_i \geq q^*$, $u'(q_i) > 1$ otherwise

Steady State

In steady state it must be that $m = M$, $a = A$, and $\phi/\hat{\phi} = \gamma$.

The prices (ϕ, ψ) are determined by

$$\begin{aligned} \phi &= \beta\hat{\phi}\left[1+\lambda_1(u'(q_1)-1)+\lambda_2(u'(q_2)-1)\right] \\ \psi &= \beta(\delta+\hat{\psi})\left[1+\lambda_2(u'(q_2)-1)\right] \end{aligned}$$

There can be **3 types of equilibria:**

1. $y_2 \geq y_1 \geq q^*$ with $u'(q_1) = u'(q_2) = 1$
2. $y_2 \geq q^* > y_1$ with $u'(q_1) > u'(q_2) = 1$
3. $q^* > y_2 > y_1$ with $u'(q_1) > u'(q_2) > 1$

Friedman rule

Look for equilibrium of type 1:

$$\begin{aligned} \phi &= \beta\hat{\phi} \Rightarrow \gamma = \beta \\ \psi &= \beta(\delta + \hat{\psi}) \Rightarrow \psi = \frac{\beta}{1-\beta}\delta \end{aligned}$$

In this equilibrium

$$\phi M \geq q^*$$

This type of equilibrium exists only under the **Friedman rule**!

Scarce money and Abundant Trees

Look for equilibrium of type 2:

$$\phi > \beta\hat{\phi} \Rightarrow \gamma > \beta$$

$$\psi = \beta(\delta + \hat{\psi}) \Rightarrow \psi = \frac{\beta}{1-\beta}\delta$$

Check:

$$\phi M < q^*$$

$$\phi M + (\delta + \psi)A > q^*$$

Result : ϕM decreases with γ

1. $\gamma \rightarrow \beta$ then this equilibrium exists even if A is small
2. $\gamma \rightarrow \infty$ then we need high A!

Scarce Money and Trees

Look for equilibrium of type 3:

$$\phi > \beta\hat{\phi} \Rightarrow \gamma > \beta$$

$$\psi > \beta(\delta + \hat{\psi}) \Rightarrow \psi > \frac{\beta}{1-\beta}\delta$$

Check:

$$\phi M < q^*$$

$$\phi M + (\delta + \psi)A < q^*$$

Result : ϕM decreases and ψ increases with γ

Liquidity premium

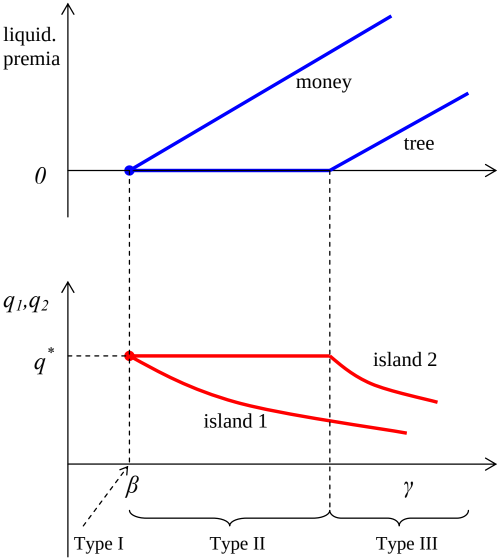
- Liquidity premium on money:

$$\frac{\phi}{\hat{\phi}\beta} - 1$$

- Liquidity premium on trees:

$$\frac{\psi}{(\hat{\psi}+\delta)\beta} - 1$$

Monetary policy



Endogenous liquidity

- Imagine buyers can pay a cost to be able to recognize good trees, and hence accept payments with both assets
- Result: as inflation increases, agents substitute trees for money and the mass of buyers who accept trees increases
- In the basic model, higher inflation increases the distortion in both islands.
- **Question: can higher inflation reduce the average distortion? The distortion in islands 2?**

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