Monetary Exchange in OTC Markets: A Theory of Speculative Bubbles, the Fed Model, and Self-fulfilling Liquidity Crises

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NBER discussion by Pierre-Olivier Weill

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• A very interesting paper!
  
  part of a research effort to bring together two literatures
  
  money-search (Lagos-Rocheteau-Wright)
  finance-search (Duffie-Gârleanu-Pedersen)
  this paper breaks a lot of new ground in this agenda
  
  confirms and extends some existing results:
  from partial equilibrium DGP to general equilibrium LRW
  
  obtains new results:
  the effect of monetary policy on asset prices and liquidity
  
• In this discussion:
  
  a simple model & a few comments
a model with three periods $t \in \{0, 1, 2\}$

- Two linear technologies
  
  production at $t = 0$: $y(h) = h$
  
  storage from $t = 0$ to $t = 1$: $s(y) = \frac{y}{1+\pi}$, $\pi > 0$
  
  low return on storage mimics inflation

- One asset with random payoff $x$ at $t = 2$
  
  tradable endowment $A$ at time $t = 0$ and $t = 1$
  
  non-tradable endowment $\omega \sim G(\omega)$, $\int_\omega dG(\omega) = \Omega$ at $t = 1$
  
  non tradable endowment mimics $\varepsilon$ in creating gains from trade

- Preferences: $\mathbb{E} [-h_0 + c_1 + U(q_2x)]$

- Competitive markets at all dates
the narrative of the model

• In the first period, $t = 0$:
  
  agents choose how much good to store until $t = 1$
  
  agents are ex ante identical, so they store the same amount

• In the second period, $t = 1$:
  
  agents draw their non-tradable endowment, $\omega \sim G(\omega)$
  
  risk aversion $\Rightarrow$ agents seek to equalize their holdings
  
  high $\omega$ want to sell, but may run into short-selling constraint
  
  low $\omega$ want to buy, but may run into budget constraint
  
  this is the key force at play in the paper

• In the third period, $t = 2$:
  
  agents enjoy the payoff of their assets
optimal asset holding at $t = 1$

- Let $Q(p_1)$ be the “target” holding solving $\mathbb{E}[xU'(Qx)] = p_1$

- Optimal holding

  sum of time $t = 1$ purchase and of $\omega$
equilibrium at $t = 1$

- Market clearing condition:

$$\int_0^{Q(p_1)} \min \left\{ \frac{m}{p_1} + A, Q(p_1) - \omega \right\} dG(\omega) = A$$

$m$: amount of goods stored from $t = 1$ to $t = 2$

$A$: amount of assets purchased at $t = 1$

- $p_1 < \text{frictionless}$ if $m$ is small enough and $\omega$'s not too large

  low $\omega$ agents are cash constrained
  $\Rightarrow$ high $\omega$ agents have to hold too much of supply
  $\Rightarrow$ risk premium high, price low
equilibrium at $t = 0$

- Let $\lambda(\omega)$ is multiplier on time $t = 1$ budget constraint
  
  $\lambda(\omega) > 1$ if below target/cash constrained at $t = 1$

- First-order condition for storage: $\mathbb{E}[\lambda(\omega)] = 1 + \pi > 1$

- Some $\omega$ must hold below target at $t = 1$
  
  otherwise better to eat at $t = 0$ rather than store till $t = 1$
  
  $\Rightarrow$ some $\omega$ must be cash constrained

- $p_1 < $ frictionless price!
a special case

Mean-variance utility: $\mathbb{E} [U(qx)] = \mathbb{E} [x] q - \frac{\eta}{2} \mathbb{V}(x) q^2$

\[
\frac{p_1}{\mathbb{E} [x]} = 1 - \frac{\pi}{1 + \pi} - \frac{1}{1 + \pi} \frac{\mathbb{V}[x]}{\mathbb{E} [x]} [A + \Omega]
\]

- $\pi = 0$: standard frictionless mean-variance price
- $\pi > 0$: price is depressed
- Interestingly, the discount for risk decreases when $\pi$ is larger
  perhaps resembles Campbell-Vuolteenaho evidence?
  a negative relationship btw risk compensation and inflation
comment # 1: L&Z vs. money illusion

• The negative relationship between inflation and asset prices traditionally attributed to money illusion here: a rational explanations arguably much more satisfactory

• How to tell apart the mechanism from that of money illusion important to convince the money-illusioned researchers!

• It would be nice to solve a money-illusion version of the model may be OTC frictions become very useful for this exercise: differential effects of money illusion on liquidity measures?
comment #2: cross sectional implications

• Differential effects in the cross-section?

  of asset riskiness (suggested by the comparative statics above)
  of asset liquidity (houses vs. stocks)
  of asset pledgeability
    cash assets can be bought on margin
    derivatives assets require cash collateral
    may be the effects are larger for the later

• Would require a version of the model with multiple assets
comment #3: strategic complementarities

- Small remark: differences with Lagos-Rocheteau (2007)?
  phenomenon similar but mechanism different

- Does multiplicity depend on monetary policy parameters?
  is it less likely to arise close to Friedman Rule?
  because it is less costly to carry money into the OTC market?

- Does multiplicity depend on other parameters?
  matching function, bargaining power, etc...

- Would some policy intervention eliminate multiplicity?