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Asymmetric Info, Trading, and Liquidity

Comments on Kyle and Duffie

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Liquidity

three key questions:

1. how do we define/measure liquidity in financial markets?
2. what are the main sources of liquidity?
3. how does liquidity affect the real economy?

What is Liquidity?

- **two common definitions** :
 1. **market liquidity**: the ease with which assets are traded
 2. **funding liquidity**: the ease with which traders can obtain funding
- these two notions are tightly linked:
 - traders trade more if they can find funding more easily
 - traders' funding depends on market liquidity

What are the sources of illiquidity?

Illiquidity may arise because of

- asymmetric information
- trading frictions
- funding constraints

What are the sources of illiquidity?

- **asymmetric information:** Akerlof(1970), Rothschild and Stiglitz (1976), Grossman and Stiglitz (1980), Kyle (1985,1989), Glosten and Milgrom (1985), Gale(1996), De Marzo and Duffie (1999), Vayanos (2001), Dubey and Geanakoplos (2002), Guerrieri and Shimer(2013,2017),...
- **trading frictions:** Duffie, Garleanu, and Pedersen (2005), Vayanos and Wang(2007), Duffie and Manso (2007), Weill (2008), Lagos and Rocheteau (2009),...
- **funding constraints:** Gromb and Vayanos (2002), Brunnermeier and Pedersen (2009), Shleifer and Vishny (1997),...

How does Liquidity affect the Real Economy?

- balance sheet effects on firms' side: Kiyotaki and Moore (1997), Bernanke, Gertler and Gilchrist (1999), Caballero and Krishnamurthy (2001),...
- deleveraging in the households sector: Mian and Sufi (2009), Eggertsson and Krugman (2012), Guerrieri and Lorenzoni (2017),...
- balance sheet effects in the banking sector: Diamond and Rajan (2001), Fostel and Geneakaplos (2008), Brunnermeier and Sannikov (2014),...

Funding Costs

- today Duffie focused on illiquidity due to funding costs
- after the crisis, space on dealers balance sheets became more expensive because of
 - increase in capital requirements
 - increase in dealers' credit spreads
- \Rightarrow reduction in use of balance sheet for intermediation
- \Rightarrow decrease in market liquidity

Debt Overhang

- suppose a dealer buys safe assets by issuing more equity
- this improves the credit quality of the dealer's debt
- value of legacy equity lowered by transfer of value to creditors
- \Rightarrow capital requirements could intensify debt overhang problem
- however, after the crisis banks became safer, so potentially there is less scope for improving credit quality

Increase in Funding Costs

- Andersen, Duffie, and Song (2018) propose a model of funding costs affecting market liquidity
- assume default is unlikely and interest rates are low
- \Rightarrow shareholders find profitable to purchase a new asset only if price is sufficiently low relative to funding cost

$$E(Y) - u(1 + S) \geq 0$$

$E(Y)$ = market value of the asset

u = per-unit marginal funding to buy the asset (price)

S = dealer's one period credit spread

- spreads increased \Rightarrow debt overhang problem worsened

Duffie (2018) meets Kyle (1985)

- informed trader knows asset valuation $v \sim N(p_0, \sigma_v^2)$
- measure $y \sim N(0, \sigma_y^2)$ of uninformed noise trader
- informed trader sets demand $x = X(v)$ before knowing y
- uninformed market makers set price to clear the market
- price $p = P(x + y)$ depends on the total demand
- informed trader borrows to buy and faces spread S
- assume that default probability is infinitesimal

Equilibrium

- $X(v)$ maximize shareholders' profits:

$$E(\pi) = \max_x E[v - P(x + y)(1 + S)]x$$

- in equilibrium:

$$P(x + y) = p_0 \left[2 - \frac{1}{1 + S} \right] + \lambda(x + y)$$

where

$$\lambda = \frac{\sigma_v}{\sigma_y} \left(\frac{1}{1 + S} \left[2 - \frac{1}{1 + S} \right] \right)^{\frac{1}{2}}$$

- larger $S \Rightarrow$ market maker knows informed trader trade less
- \Rightarrow respond more to changes in demand
- \Rightarrow larger **price impact** and smaller price informativeness

Funding Costs and Fire Sales

- standard adverse selection models: sellers informed
- \Rightarrow a fire sale can ease adverse selection!
- not in GE dynamic model like Guerrieri and Shimer (2017)
- because value of funds increases in expectation of distress
- now imagine buyers have heterogenous information in the spirit of Kurlat(2017)
- if funding illiquidity reduce trading of informed dealers
- marginal buyer may be uninformed and price might go down even further

Back to Trading Frictions

- improving dealers/banks competition may alleviate debt overhang problem
- OTC markets are opaque: dealers do not compete with each other
- dealers more affected by debt overhang offer lower prices
- dealers competition may reduce the trade of dealers with higher costs
- and improve liquidity...
- traders may decide to sell more if they expect better prices

Challenges

- measure liquidity - Kyle and Obizhaeva (2018)
- combining funding costs and informational frictions
- embed richer models of liquidity in macro especially for policy design