Asset Price Dynamics with Slow-Moving Capital

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Darrell Duffie
Stanford University

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Efficient market price

Stationary illiquid market price

With limited capital mobility and supply shock
Figure 1: Cumulative returns for dropped S&P500 stocks.
Figure 2: Modeled price path with slow investors
Figure 3: An over-the-counter market.
Figure 4: Source: Duffie, Gârleanu, and Pedersen (2007).
Figure 5: A centralized market.
Figure 6: A hybrid market structure.
Figure 7: Capital migrates from markets with low risk premia to markets with high risk premia. Duffie and Strulovici (2008).
Figure 8: Catastrophe risk: premiums and global volume of claims. Source: Swiss Re.
Figure 9: Reinsurance risk premia by line. Source: Swiss Re.
CDS Basis (in basis points) for Investment Grade (bold) and Speculative Grade Bonds. Source: Mitchell and Pulvino (2009)
Excess profits from CIP arbitrage (short dollar spot positions)

source: Mancini-Griffoli and Ranaldo (2009)
Empirical Evidence from Supply-Shock Price Reactions

- Fire sales from mutual fund redemptions: Coval and Stafford (2007).
A Sample of Related Theory


- Stationary equilibrium with delayed trade: Gărleanu (2009), Rosu (2009).

- Endogenous investor inattention: Duffie and Sun (1990); Abel, Eberly, Panageus (2009).
Figure 10: Cumulative stock return of acquirer around merger closing. Index rebalancing (red) applies if the acquirer is in the S&P 500 and the target is not. Source: Mitchell, Pulvino, and Stafford (2004).
Figure 11: “Fire sales.” Source: Coval and Stafford (2007).
Equilibrium Model of Supply Shocks with Slow Investors

- A fraction $q$ of investors are “inattentive” for $k$ periods after each trade.
- Every period, $1/k$ of the inattentive investors trade.
- The remaining investors trade every period.
- The asset supply $Z_t$ and dividend process $X_t$ are jointly Gaussian and autoregressive.
- All investors have additive exponential utility.
\[ H_t = (D_{t-1}, D_{t-2}, \ldots, D_{t-k+3}, D_{t-k+2}, D_{t-k+1}) \]
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\[ H_{t+1} = (D_t, D_{t-1}, D_{t-2}, \ldots, D_{t-k+3}, D_{t-k+2}) \]
Stationary Model Solution

- Let $H_t = (D_{t-1}, D_{t-2}, \ldots, D_{k-1})$ be the vector of quantities held off the market by slow investors.
- The state vector is $Y_t = (Z_t, X_t, H_t)$.
- Price: $S_t = c \cdot Y_t$.
- Frequent investor demand: $K_t = b(c) \cdot Y_t$.
- Inattentive-investor demand: $D_t = a(c) \cdot Y_t$.
- Dynamics: $Y_{t+1} = A(c)Y_t + B\epsilon_t$. So,
  $$E(Y_{t+k} \mid Y_t) = A(c)^k Y_t.$$
- Market clearing: $D_t + K_t = Z_t - 1 \cdot H_t \equiv g \cdot Y_t$.
- Solve the market-clearing equation $a(c) + b(c) = g$ for $c$. 
Figure 12: Cumulative returns for dropped S&P500 stocks.
Figure 13: A random supply shock occurs on date 1.
Figure 14: A random supply shock occurs on date 1.
Figure 15: Capital immobility in the Telecom debt market Source: Newman-Rierson (2003).
Figure 16: Average price dynamics around secondary equity issuances. Source: Jan Peter Kulak (2008).
Figure 17: On date 1, a block sale is announced to occur on date 32.
Figure 18: Pre-supply-shock limit orders to buy.
Figure 19: Only the solid-red limit orders remain after the shock.
Figure 20: New (blue) limit orders arrive.
Figure 21: Another market order arrives.
Figure 22: Some supply shocks are "fundamental."
Perspective

- Asset prices can move away from “fundamental” values if capital is not perfectly mobile.

- More precisely, the fundamentals include state variables determining the immediate and future availability of capital.

- Models based on imperfect search are especially natural for dealer-intermediated and over-the-counter markets.

- Capturing trading delays is crucial for any almost any market.

- The time signatures of price responses to supply shocks help identify capital immobility.