1. Portfolio Shifts Model and the Role of Order Flow

Portfolio shifts by public cause exchange rate change

not common knowledge when they occur
large enough that market clearing requires exchange rate to change

There are T periods & 2 assets: riskless & fx with stochastic payoff F

\[ F = \sum_{t=1}^{T} r_t \]

where innovations are iid \( \sim N(0, \Sigma_r) \)

\( r_t \) observed before trading each period (public info.)

Decentralized market with N dealers i and continuum of non-dealer customers
all have identical neg. exponential util. defined over wealth at T

3 trading rounds each day t
TRADING ROUND 1

a) observe $r_t$ at beginning of period

b) all dealers simultaneously & independently quote a scalar price $P_{il}$
   at which any amount may be bought or sold

c) customer orders $c_{il}$ at $P_{il}$

   $c_{il} < 0$ is customer sale (dealer buy)

   $c_{il} \sim N(0, \Sigma_{cl})$ for each of $N$ orders

   orders are indep. across dealers

   orders are distributed indep. of public info. $r_t$

   these are the portfolio shifts that are not publicly observable
TRADING ROUND 2

a) each dealer simultaneously & indep. quotes a scalar price to other dealers $P_{i2}$

at which any amount may be bought & sold

interdealer quotes observable & available to all dealers

b) dealers trade on other's quotes

at any given $P$, orders evenly split across any dealers quoting that $P$

$$\Delta x = \sum_{i=1}^{N} T_{i2}$$ is net interdealer order flow

interdealer trade transparent to all dealers (no noise)
TRADING ROUND 3

a) dealers quote scalar price $P_{i3}$

$P_{i3}$ conditioned on interdealer order flow 
(dealers know amount public must absorb)

any amount may be traded

observable & available to public at large

public absorbs dealer unwanted inventory

each dealer ends day with 0 net position

b) public trades at $P_{i3}$

$c_3 = \gamma(E[P_{3,t+1} | \Omega_{3,t}] - P_{3,t})$

so public's total demand is function of expected return

$\gamma$ captures agg. risk-bearing capacity of public
EQUILIBRIUM

Dealer's problem is:

\[
\max \ E \left[ -\exp(-\theta \omega_{i3} | \Omega_i) \right] \\
\text{s.t.} \\
w_{i3} = w_{i0} + c_{i1}(P_{i1} - P_{i2}) + (D_{i2} + E[T_{i2} | \Omega_i])(P_{i3} - P_{i2}) - T_{i2}(P_{i3} - P_{i2})
\]

" denotes interdealer quote or trade

yields price equation:

\[
\Delta P_t = r_t + \lambda \Delta x_t
\]

for \( r \) use \( \Delta(i-i^*) \)

estimate:

\[
\Delta P_t = \beta_1 \Delta(i_t - i_t^*) + \beta_2 \Delta x_t + \eta_t
\]
ESTIMATION

Data: Reuters Dealing 2000-1

*time, price, and signed trade (+ buy, - sell)
*no quantity, no quotes
*take price from 4pm to 4pm GMT
*(i-i*) overnight rates from Datastream (4pm GMT)

Sig. & pos. order flow effect

*high $R^2$
*estimates indicate that day with 1000 more purchases than sales $\uparrow$DM/$ by 2.1%

If order flow drives prices, what drives order flow?

References