Discussion of "Liquidity Intermediation in the Euro Money Market" by Stefan Reitz & Falko Fecht

Peter Hoffmann

ECB[1]

Oct 22, 2013

[1] Disclaimer: The views expressed do not neccessarily relect those of the ECB.

Summary

- The crisis has highlighted the importance of the interbank market
- Signs of market stress
  - counterparty risk
  - liquidity hoarding
  - unsecured $\longrightarrow$ secured
- Big issue: Limited data availability
  - mostly bilateral OTC trading
- This paper analyzes a dataset from a large MM dealer
  - Estimate structural MM Model of dealer intermediation
  - adverse selection, inventory risk, counterparty risk, etc.
  - pre-post Lehman crisis

An extension of Madhavan & Smidt (1991, JFE)

- The money market essentially works as a decentralized OTC markets
- A dealer prices interbank loans as follows
  $p_t = \mu_t - \gamma(I_t - I^*) + \delta M_t + \rho C_t + \psi D_t$
  where
  D_t : Trade direction
  $I_t - I^*$: Deviations from target inventory (usually $I_t^* = 0$)
  M_t : maturity
  C_t : credit risk
  μ_t : Dealer's expectation about fundamentals

Adverse Selection

- However: Customers have private information about fundamentals
- Consequently, the dealer learns from the order flow q_t, such that his estimate of μ_t is
  $\mu_t = \pi y_t + (1-\pi)(p_t + \frac{1}{\alpha} q_t)$
  where
  y_t : Public signal
  π : Weight on public info
  α : responsiveness of insider to private information
- After some algebra, we get the following structural pricing equation

$$\Delta p_t = (\frac{1}{\pi} - 1) I^* + \frac{(1-\pi)}{\alpha\pi} q_t - \frac{\gamma}{\pi} I_t + \gamma I_{t-1} + \frac{\delta}{\pi} M_t - \delta M_{t-1} + \frac{\rho}{\pi} C_t - \rho C_t + \frac{\psi}{\pi} D_t - \psi D_{t-1} + \eta_t$$

Data

- Transactions of a major European dealer
- 2007-2008 (510 days)
  - 3 subperiods (normal, pre-Lehman turnmoil, post-Lehman)
- Time, counterparty, size, direction, maturity
- 17,888 transactions
  - 15,348 deposits
  - 2,540 loans

Estimation

- Pricing equation is estimated by GMM
  - no excluded instruments, hence GMM=OLS
- Additionally control for
  - lagged price changes
  - relationships (# trades with counterparty)
  - EONIA
  - "large" trades (above median)

Results (Noon)

	Full sample	Normal Times	Post Lehman
Deal Size	-3.80^{**}	-8.83^{**}	-15.81^{*}
Direction	8.26^{***}	6.36^{***}	14.89^{***}
Direction(-1)	-5.71^{***}	-2.49^{***}	-12.35^{***}
Inventory	-2.17^{***}	-0.35	-5.23^{***}
Inventory(-1)	2.45^{***}	0.55	5.14^{***}
Credit	0.27	7.54^{***}	19.57^{***}
Credit(-1)	1.24^{***}	5.58^{***}	-6.43^{**}
Maturity	0.43^{***}	0.81	0.42^{***}
Maturity(-1)	-0.42^{***}	-0.99^{***}	-0.41^{***}
# Trades	0.77^{***}	1.33^{***}	0.29^{***}

- Larger trades receive discounts (!)
- Transaction costs & inventory considerations increase in crisis
- Similar for credit risk & maturity premia
- Based on trade directions, π increases to 1 (all weight on public info)

Comments - Estimation

- Recall **structural** pricing equation

$$\Delta p_t = (\frac{1}{\pi} - 1) I^* + \frac{(1-\pi)}{\alpha\pi} q_t - \frac{\gamma}{\pi} I_t + \gamma I_{t-1} + \frac{\delta}{\pi} M_t - \delta M_{t-1} + \frac{\rho}{\pi} C_t - \rho C_t + \frac{\psi}{\pi} D_t - \psi D_{t-1} + \eta_t$$

- Authors apply **reduced form** estimation (GMM/OLS)

$$\Delta p_t = \alpha + \beta_1 q_t + \beta_2 I_t + \beta_3 I_{t-1} + \beta_4 M_t + \beta_5 M_{t-1} + \beta_6 C_t + \beta_7 C_t + \beta_8 D_t + \beta_9 D_{t-1} + \eta_t$$

Comments - Estimation

- 10 Coefficients $(\alpha, \beta_1 - \beta_9)$, but only 7 structural parameters $(\alpha, \gamma, \delta, \rho, \pi, \psi, I^*)$
- The model is overidentified!
- Need to pin down $\pi = \frac{-\beta_2}{\beta_3} = \frac{\beta_4}{-\beta_5} = \frac{\beta_6}{-\beta_7} = \frac{\beta_8}{-\beta_9}$ using coefficient restrictions
- GMM can actually be helpful here, as ML would involve making distributional assumptions
- This is important because the authors make statements on π
  - "the process of information aggregation ... is systematically hampered"

Comments - Identification

- Identification stems from relating price changes to differences in transaction attributes (direction, credit risk, maturity)
- Descriptive statistics suggest that caution is warranted, especially in subsamples
- Trade direction (ψ)
  - few loans (80-95% of trades are deposits)
  - Especially post-Lehman, loans/deposits cluster at different times
  - large relative drop in loans (only 2.5 loans/day in 3rd subsample)
- Credit risk (ρ)
  - Small variation in borrower risk, large variation is lender risk
  - Why should depositor risk be priced ?
- Maturity (δ)
  - Most volume is overnight ($\sim$ 60% of trades, $\sim$ 75% of volume)
  - focus on O/N

Comments - Identification

Day Time				
Number of Loans				
Morning	177	490	98	765
Noon	92	234	28	354
Afternoon	502	874	45	1421
Sum	771	1598	171	2540
Number of Deposits				
Morning	547	674	361	1582
Noon	1600	1851	1201	4652
Afternoon	2676	4458	1980	9114
Sum	4823	6983	3542	15348

Notes: First, second, third refer to the subsample periods.

Comments - Identification

- Identification stems from relating price changes to differences in transaction attributes (direction, credit risk, maturity)
- Descriptive statistics suggest that caution is warranted, especially in subsamples
- Trade direction (ψ)
  - few loans (80-95% of trades are deposits)
  - Especially post-Lehman, loans/deposits cluster at different times
  - large relative drop in loans (only 2.5 loans/day in 3rd subsample)
- Credit risk (ρ)
  - Small variation in borrower risk, large variation is lender risk
  - Why should depositor risk be priced ?
- Maturity (δ)
  - Most volume is overnight ($\sim$ 60% of trades, $\sim$ 75% of volume)
  - focus on O/N

Comments - Identification

Table 2: Descriptive Statistics Across Ratings and Day Time
510 trading days between Jan 2, 2007 – Dec 31, 2008

	First	Second	Third	Full sample
	Counterparty rating			
Number of loans				
AAA	69	178	72	319
AA	497	966	39	1502
A	129	410	59	598
BBB	12	22	1	35
BB	0	0	0	0
B	1	3	0	4
CCC	0	0	0	0
NR	63	19	0	82
Sum	771	1598	171	2540
Number of deposits				
AAA	123	83	73	279
AA	516	945	501	1962
A	686	708	485	1879
BBB	286	497	265	1048
BB	627	1022	340	1989
B	124	335	98	557
CCC	24	4	21	49
NR	2437	3389	1759	7583
Sum	4823	6983	3542	15348

Comments - Identification

- Identification stems from relating price changes to differences in transaction attributes (direction, credit risk, maturity)
- Descriptive statistics suggest that caution is warranted, especially in subsamples
- Trade direction (ψ)
  - few loans (80-95% of trades are deposits)
  - Especially post-Lehman, loans/deposits cluster at different times
  - large relative drop in loans (only 2.5 loans/day in 3rd subsample)
- Credit risk (ρ)
  - Small variation in borrower risk, large variation is lender risk
  - Why should depositor risk be priced ?
- Maturity (δ)
  - Most volume is overnight ($\sim$ 60% of trades, $\sim$ 75% of volume)
  - focus on O/N

Further Comments

- More fundamentally, what is private information in the overnight money market?
- Information about "true" overnight rate?
- Negative coefficient on deal size not consistent with standard theory
  - Is deal size normalized by bank size?
- Maybe consider other dealer models (e.g. Huang and Stoll)
- Maybe abstract from private info
  - Literature on relationships (formally include relationship variable in pricing equation)

Minor Stuff

- Data treatment
  - "The credit risk premium is set to zero when no rating is available"