EUROPEAN CENTRAL BANK

EUROSYSTEM

Benoit Nguyen

European Central Bank

Discussion of ‘Liquidity risk and funding cost’

by A. Bechtel, A. Ranaldo and J. Wrampelmeyer

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Overview

1. This paper in a nutshell

Research question:

- How much would you be willing to (over)pay to secure short-term funding ?
- This paper: heterogeneity in funding costs depends on your liquidity risk, here identified as how much impatient you are to secure your funding

Model:

- A fraction θ of banks faces high frequency liquidity shocks, arrives later in the market and has a higher probability of not being executed with limit order
- Intuitive model to derive the equilibrium rates depending on execution probabilities, motivating the empirical exercises

Data:

- 10y (2006-2016) of overnight transactions in GC pooling ECB basket repo, cleared by Eurex, with timestamp, volume, repo rate, bank id.
- Panel data: 96 banks during 2807 trading days.
- Controls for bank profitability, leverage, credit risk, balance sheet structure

Identification : order type reveals whether a bank faces liquidity risk or not

- market order (impatient, facing liquidity risk) or limit order (patient, less concerned about liquidity risk)
- a bank with a majority of market orders is identified as high liquidity risk bank for the day

1. This paper in a nutshell

$$r^{e}{}_{i,t} = r_{i,t} - \overline{r_t}$$

$$r^{e}{}_{i,t} = \alpha\, LiquidityRisk_{i,t} + \beta X_{i,t} + FE_i + FE_t + \varepsilon_{i,t}$$

OLS estimator with fixed effects: FE_i captures bank invariant characteristics, eg. business model ; FE_t captures common variation of the day, eg. Level of excess liquidity

Controls for bank time-varying credit risk (CDS), balance sheet structure and leverage

Robustness: dynamic panel regression (Arellano-Bover) to take into account the possible autocorrelation of the dependent variable ($r^{e}{}_{i,t}$ not independent from $r^{e}{}_{i,t-1}$)

$$r^{e}{}_{i,t} = \gamma r^{e}{}_{i,t-1} + \alpha\, LiquidityRisk_{i,t} + \beta X_{i,t} + FE_i + \varepsilon_{i,t}$$

Additional exercises: on subperiods, using alternative thresholds…

1. This paper in a nutshell

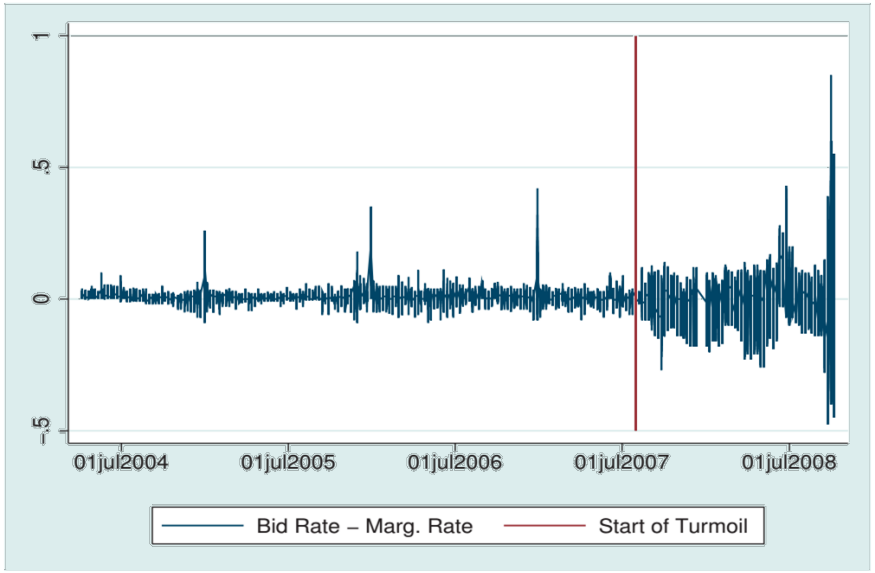
Results:

- High liquidity risk borrowers are willing to pay up to 2bps more than low liquidity risk peers
- Heterogeneity also present for impatient lenders
- This result is robust to controls for the bank business model, credit risk, size, leverage.
- This difference is systematic and persistent over the 10 years of observations
- About 3 to 4 times higher in times of crisis
- This markup has halved with the floor system
- There is a “term structure” of the $r^e_{i,t}$ spread of banks in high liquidity risk: higher for ON than for TN and SN.

2. Evidence of heterogeneity in funding costs in the money market

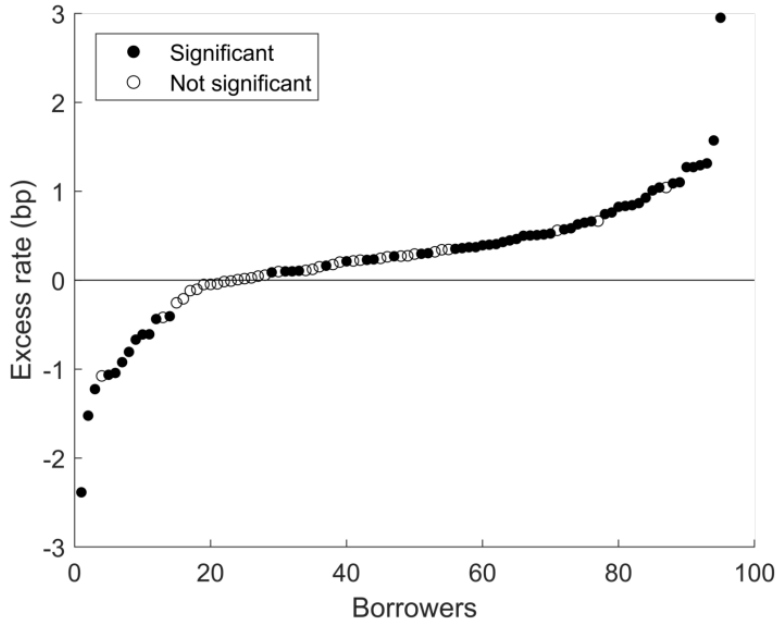
- Heterogeneity in funding costs at the central bank ('tender spread') linked to liquidity risk: Välimäki (2006), Eisenschmidt et al. (2009), Drehman and Nikolaou (2010)
- Since Oct 2008, GC repo market is a natural field to monitor this relationship

Spread between banks' individual bid rates and marginal rate at ECB refinancing operations



Source: Eisenschmidt et al. (2009)
Note: Sample of variable-rate refinancing operations (MRO+LTRO) between March 2004 and October 2008. Y-axis in %.

Cross-section of average excess rates in the GC pooling repo market



Source: Bechtel et al. (2018)
Note: Excess rate is computed as the difference between daily volume-weighted average of repo rate pay by bank i at date t and the volume-weighted average of all overnight transactions from the GC Pooling ECB basket.

3. A closer look to empirical assumptions

Identification strategy and empirical setup highly dependent on a number of (strong) assumptions

Assumption 1: The only motive for the transactions observed is funding. Market making, arbitrage or other motives can be discarded.

Assumption 2: A bank liquidity risk profile can be revealed by its propensity to use market orders

Assumption 3: There is neither counterparty risk nor trading relationship priced in these transactions

3. A closer look to empirical assumptions

Assumption 1: the only motive for the transactions observed is funding

- ✓ GC Pooling ECB basket: safe to assume it is not security-driven, robustness with ECB extended basket
- ✓ Evidence provided that a large fraction of banks stays in the same side along the day (borrower or lender) : seems to exclude market making + bid ask spread 0.01 !
- Spread is found significant both for impatient lenders and impatient borrowers: is it sufficient to discard arbitrage ?

Assumption 2 : A bank liquidity risk profile can be revealed by its propensity to use market orders

- ✓ Bank levels controls and bank fixed effects
- Could be more directly double-checked ? eg. exposure to wholesale market
- Is there a way to discriminate between 'stop loss' and 'take profit' limit orders?
- Is there a bank intraday pattern in the use of market orders(MO)/limit orders (LO)?
  - eg. Bank A starts its day with LO, after several stop losses switches to MO

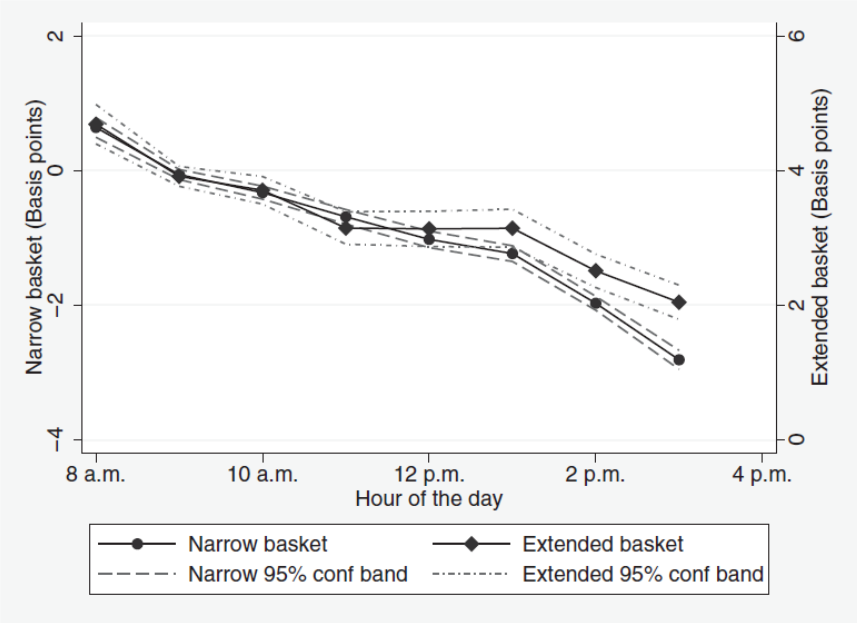
Assumption 3

- There is neither counterparty risk nor trading relationship priced in these transactions
  - ✓ CCP design, anonymity and common participation rules (eg. same haircuts)
  - *"In addition to entering quotes two participants may agree on a trade bilaterally and enter the repo transaction into the system by using the pre-arranged trading functionality" (http://www.eurexrepo.com/repo-en/markets/gc-pooling-market/)*

3. Identification assumptions: Liquidity shock or market timing ?

- One additional exercise focuses on banks switching direction during the day (eg. from lender to borrowers) as a liquidity shock. Those banks have **79% more odds** to use market orders when switching directions
- Intraday patterns in the GC repo market: rates tend to be lower in the afternoon (Abassi et al. (2017))
- Also found in your panel regression results (negative coefficient of 'TradeTime')
- Could it be the case they lend in the morning, borrow in the afternoon?

Intraday term structure in the GC Pooling market (narrow and extended baskets)

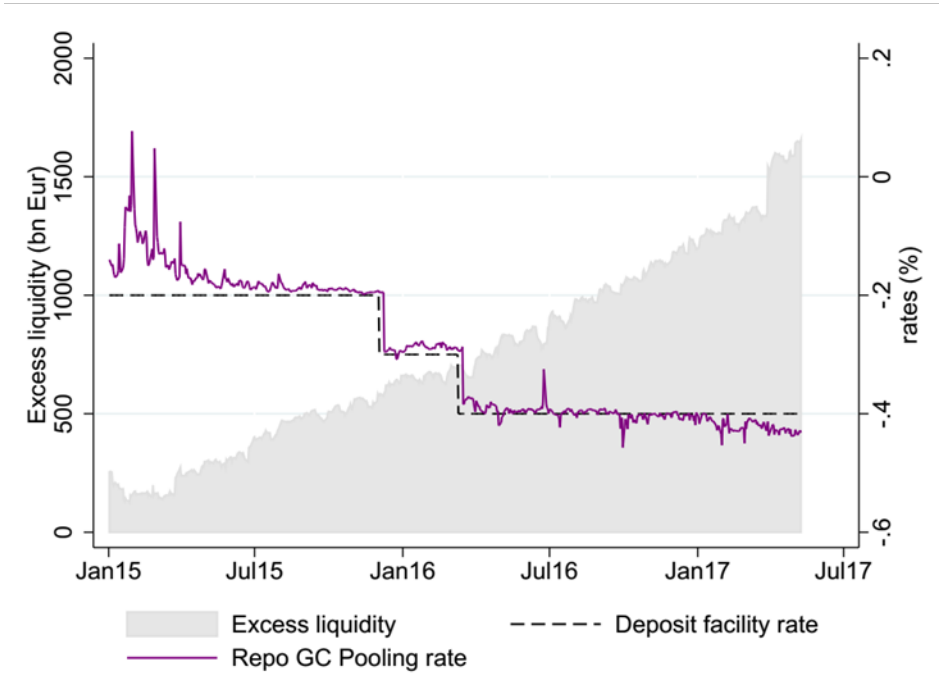


Source: Abbassi et al. (2017)
Sample period: 2008-2012

4. Questions and suggestions

- Day-FE and floor system subsample capture the excess liquidity effects, could be interesting to document the impact of quick tenders, LTROs, introduction of FRFA, decrease of reserve requirement…
- Since the end of your sample, GC pooling rate started to trade below the DFR, could it be linked to your spread ?
- Other possible explanation: some GC Pooling participants doe not have access to the central bank (eg. some GB and CH banks), do you have them in your sample, and do they have a specific behaviour?
- Having the full order book (both executed and non-executed orders, time of the limit order request) could be a future avenue for extensions: document the probability of not being executed with limit order, etc.

Cross-section of average excess rates in the GC pooling repo market



Source: Eurex, ECB, Arrata et al. (2017)
Note: GC Pooling O/N rate
Last observation: 9 May 2017

5. To sum up

- Elegant idea and interesting paper
- Many interesting results, long time frame (10y of transactions data)
- Policy relevant: how much excess liquidity and floor system contributed to lower the funding costs volatility ; links with financial stability and bank lending channel ; extremely useful to extend the ‘tender spread’ literature
- Strong assumptions, but clever use of the GC repo market design…
- … and backed by considerable amount of tests and robustness checks
- Careful econometric setup and convincing robustness tests
- I strongly recommend its reading !