Repo Market Microstructure in Unusual Monetary Policy Conditions

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Repo: "B2B" & "B2ECB"

- Repo market = collateralized interbank lending
  - Liquidity management, sharing of liquidity
  - market making, leveraged speculation, shorting
  - ECB Monetary operations... by **reverse** repo auctions!
    - Thus a substitute for B2B repos in unusual circumstances
    - B2B market can rectify imbalances caused by auction allocations
    - Official Ops a source of aggregate shocks during crisis

Repo Microstructure Literature

Drehmann & Nikolau (2010).... indicator of "*funding-liquidity risk aversion*" based on bidding behaviour in ECB MROs.

Eisenschmidt, Hirsch & Linzert (2009)...also highlight aggressive bidding in ECB ops during crisis

Brunetti, Filippo & Harris (2009)

- Crowding out of **e-mid** interbank activity
- Increased uncertainty

Questions...about ECB auctions

– Policy objectives

- 'Target rate' policy versus liquidity provision

- Contribution to uncertainty

– Behaviour of participants in auctions?

- Number of bidders

- Aggressiveness of bidding

- B2B intermediation driven out?

Questions...B2B

– Why a residue of counterparty risk in repo market?

– Did liquidity contract in anticipation of generous monetary policy operations?

– Did it suffer further liquidity contraction after ops?

  • Permanent or temporary?

  • What lessons for re-intermediation?

We examine

Policy developments and interbank market microstructure.

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Examines policy developments and interbank market microstructure.

Identify measures of *funding liquidity risk aversion* in the secondary market

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Examine the interaction between *funding liquidity risk aversion* in official auctions and in the interbank repo market

– Tests whether the secondary market anticipates ECB auction outcomes

– Tests whether surprise outcomes from operations affect the secondary repo market post-auction?

B2B Market Data...BrokerTec orderbook

Reconstruct orderbook at 15 minute intervals (average daily)

- German GC "Tomorrow-Next" provides benchmark

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Participants/Functioning…

- EU repo market ≈ size of US Treasury Repo Mkt

- Nearly all European banks (not PD driven as in US)

- BrokerTec ≈ 20% of all repo volume in Europe

- Central Counterparty: LCH Clearnet

Pre-Crisis, Crisis I, Crisis II

- Pre-crisis: (Jan-2006……Jul-2007)

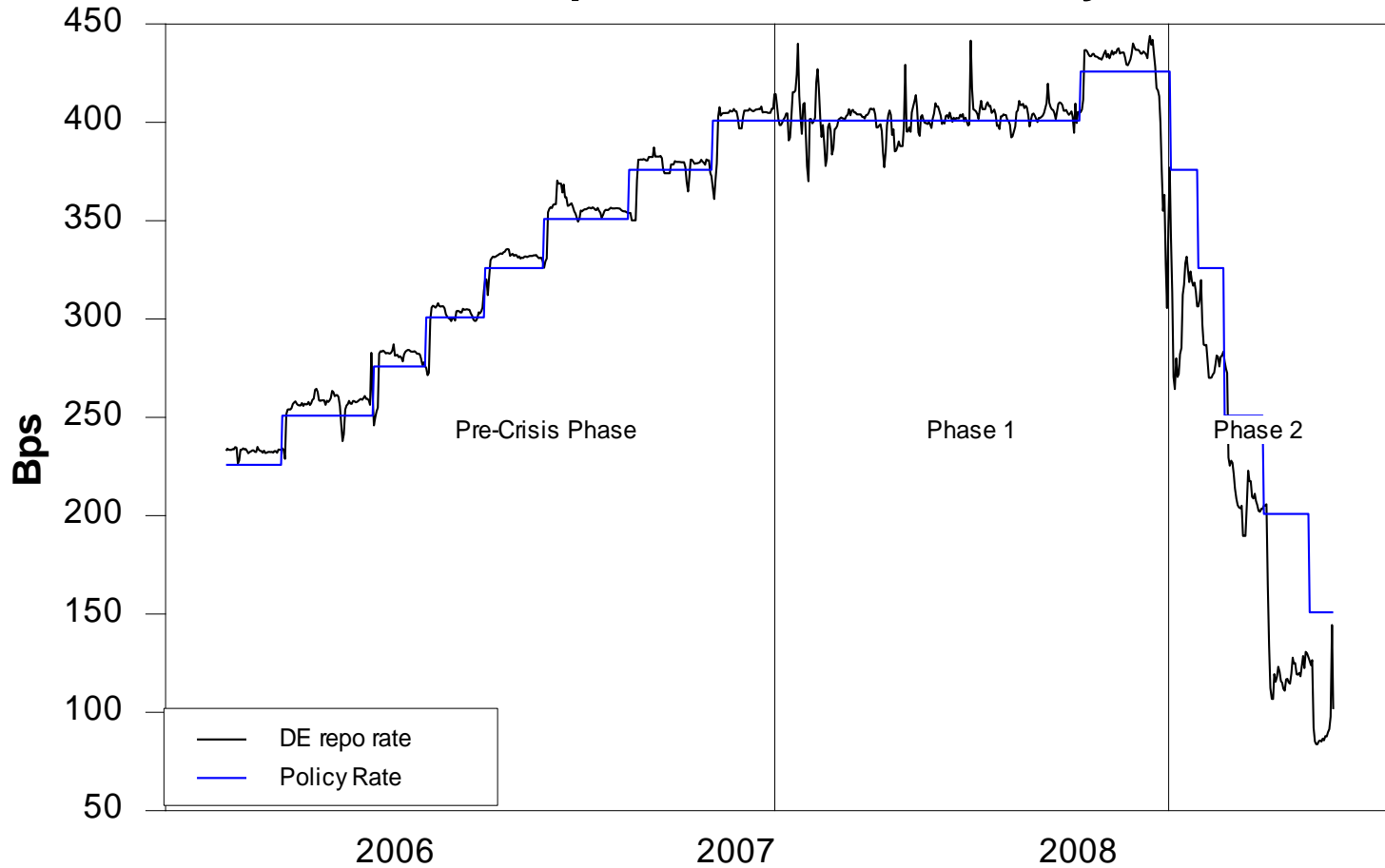Crisis I: (Aug-2007……mid Oct-2008)

  – *Target rate divergence*

  - demand > increased allotment

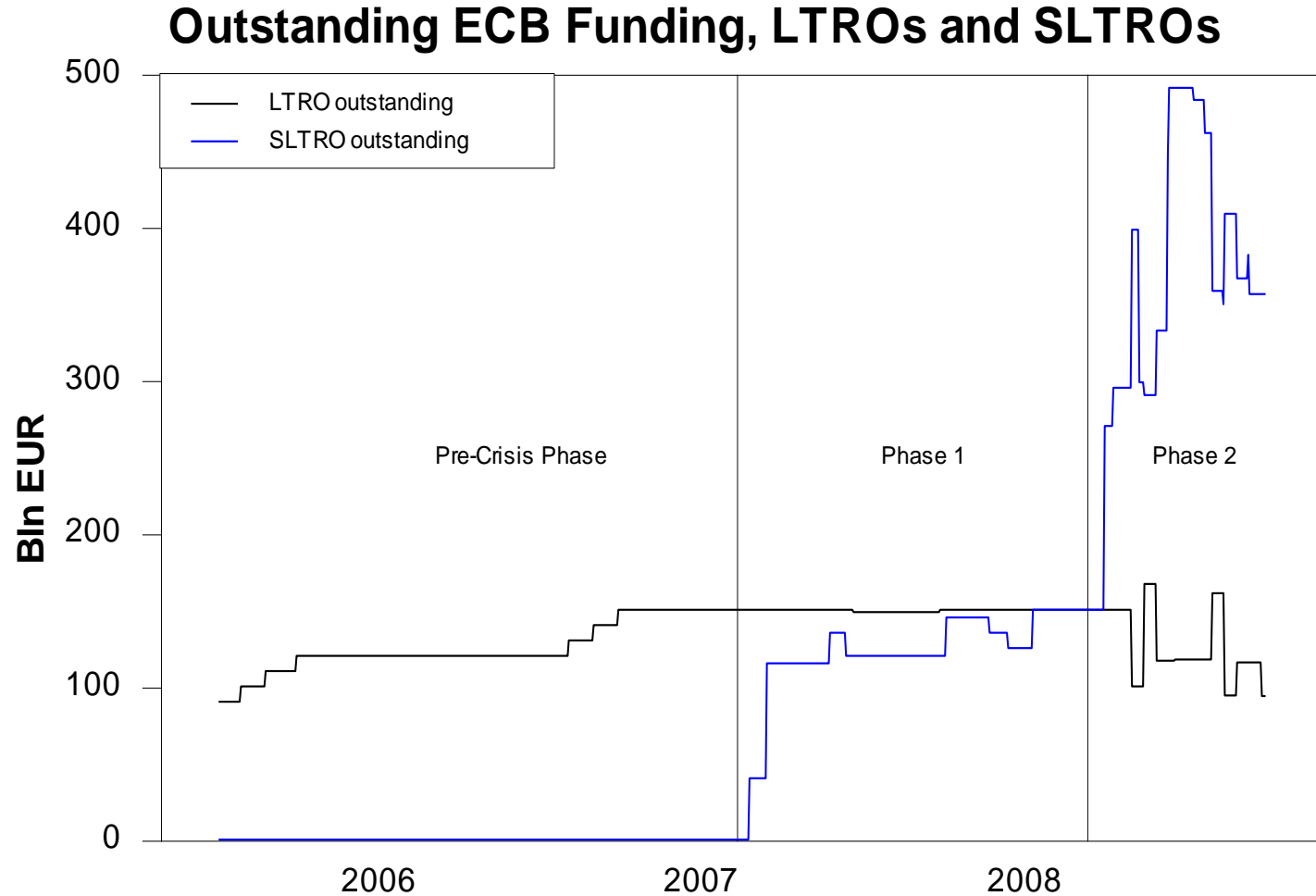- Crisis II: (mid Oct-2008……Apr-2009)

  – *Full allotment*, at fixed-rate

Interbank repo rate usually above policy rate until the second crisis phase

German GC repo rate and ECB Policy Rate

Pre-Crisis Phase   Phase 1   Phase 2
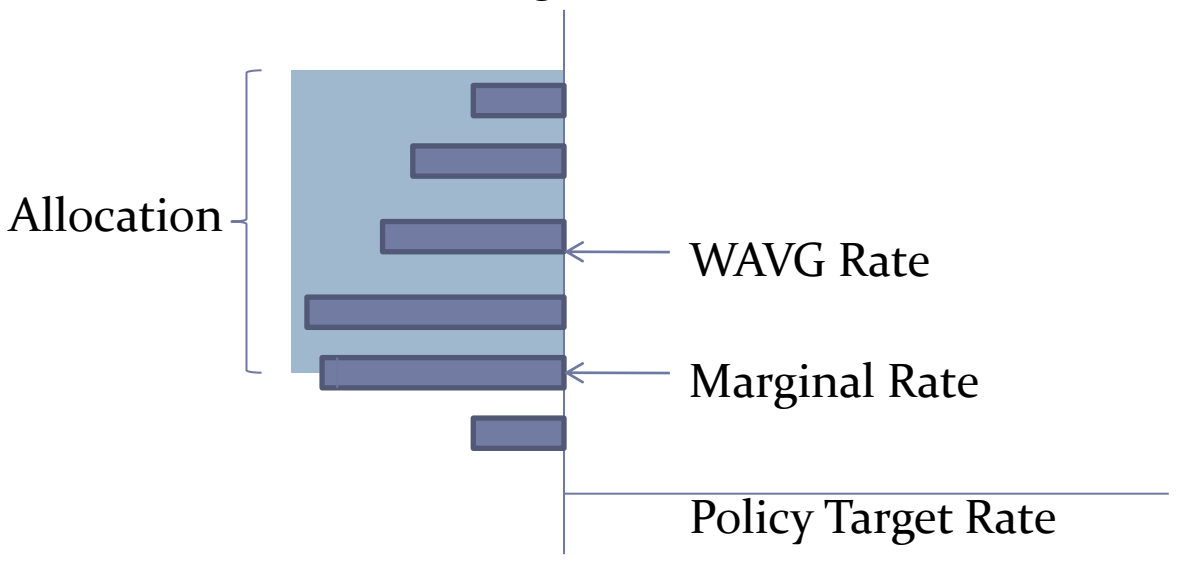
Legend: DE repo rate, Policy Rate

Y-axis: Bps (50, 100, 150, 200, 250, 300, 350, 400, 450)

X-axis: 2006, 2007, 2008

Increasing outstanding supply of funding but mainly in the last period!

Outstanding ECB Funding, LTROs and SLTROs

Measure of *funding liquidity risk aversion*
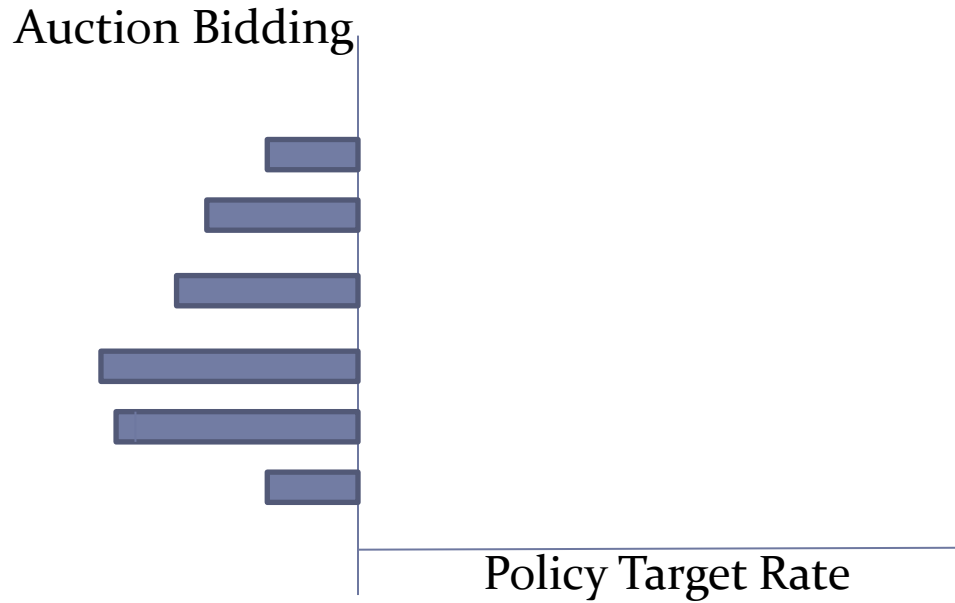
Auction Bidding

Policy Target Rate

Auction Bidding

Allocation

WAVG Rate

Marginal Rate

Policy Target Rate

Auction Bidding

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Policy Target Rate

Repo Orderbook

B3

B2

B1

A1

A2

A3

Auction Bidding
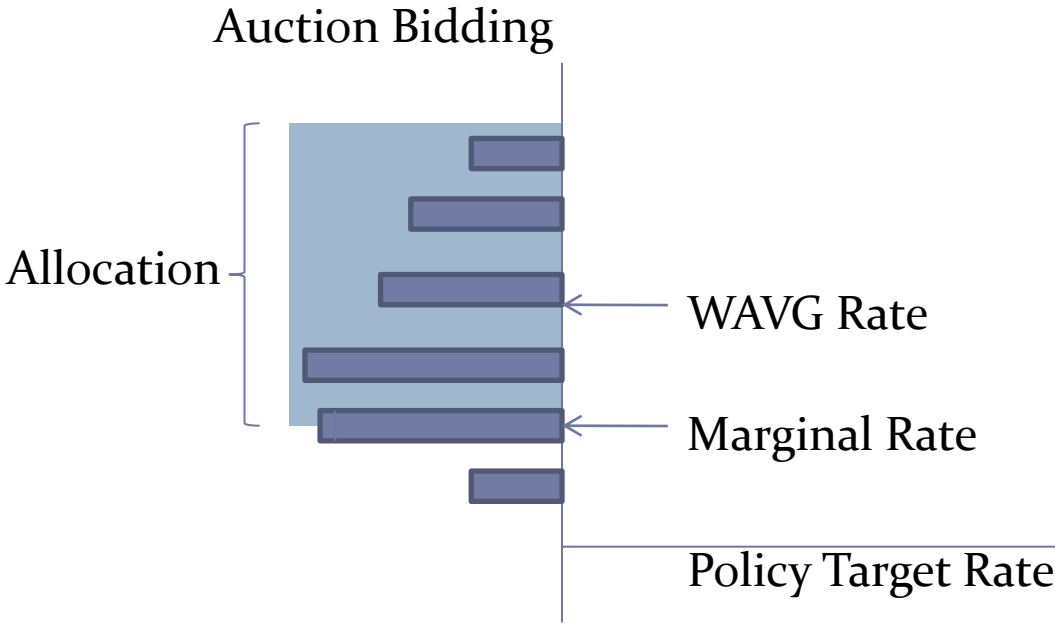
Allocation

WAVG Rate

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Repo Orderbook

B3
B2
B1

A1
A2
A3
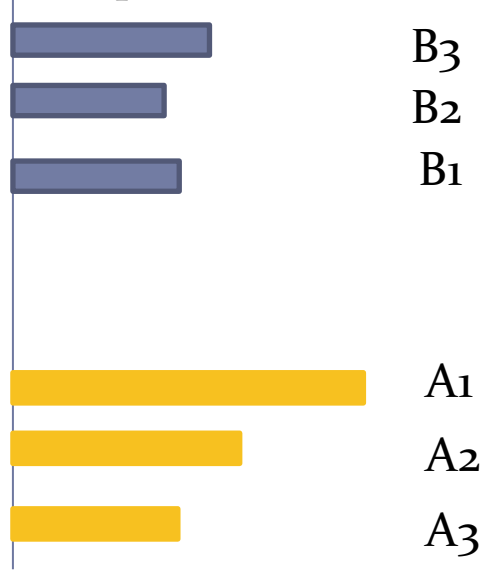
Wanting at least **B1** yield to supply funds
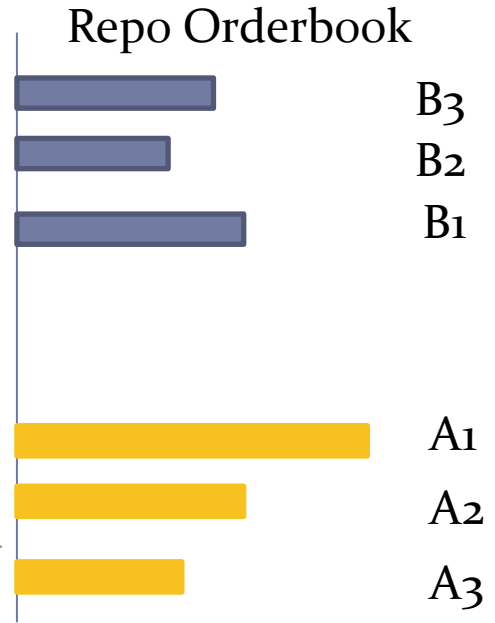
Willing to pay at most **A1** yield to obtain funds

B

(B-A)

← WAVG Rate

Y ← Marginal Rate   A

(Y-T)   (A-T)

Target = "T"

Qa ÷ Qb   }   LIQ
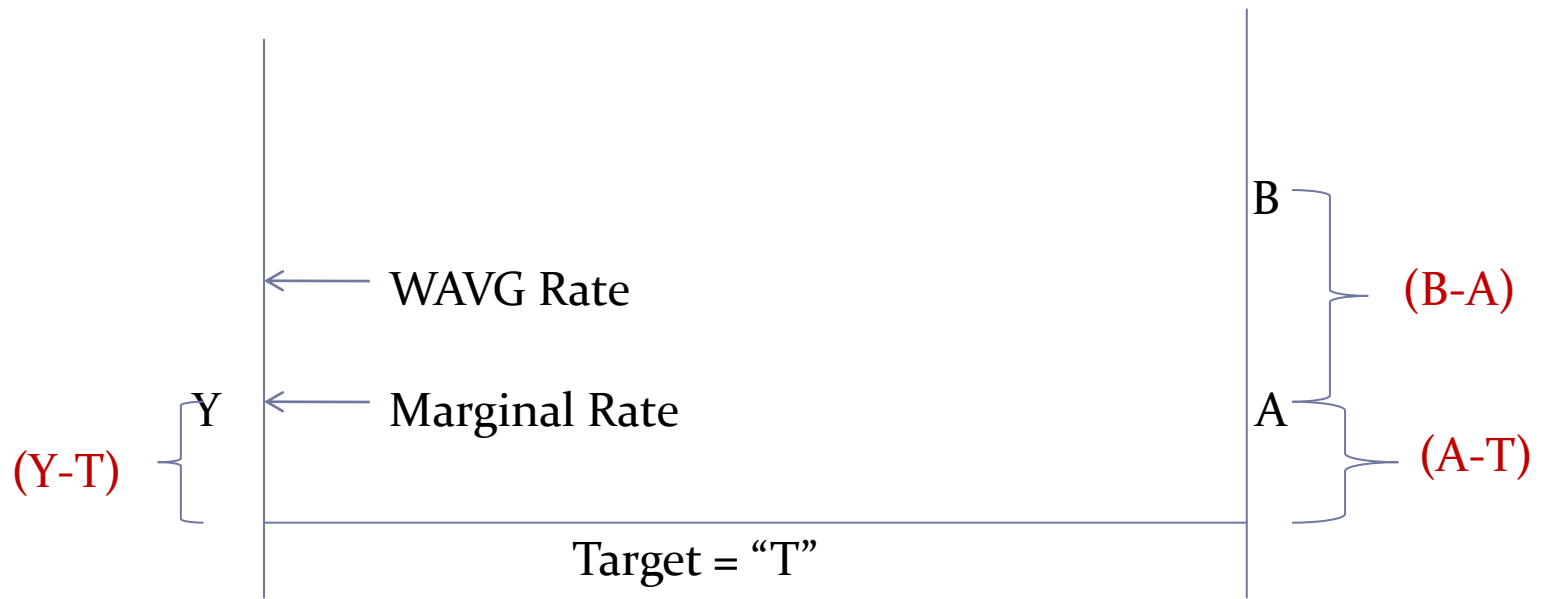
WAVG rate divergence!

EONIA-OIS Spread and the WAVG Rate in auction - reference rate

Right Axis: WAVG rate spread

Pre-Crisis Phase

Phase 1

Phase 2

| EONIA1WOIS | AWAYRATEMRO |
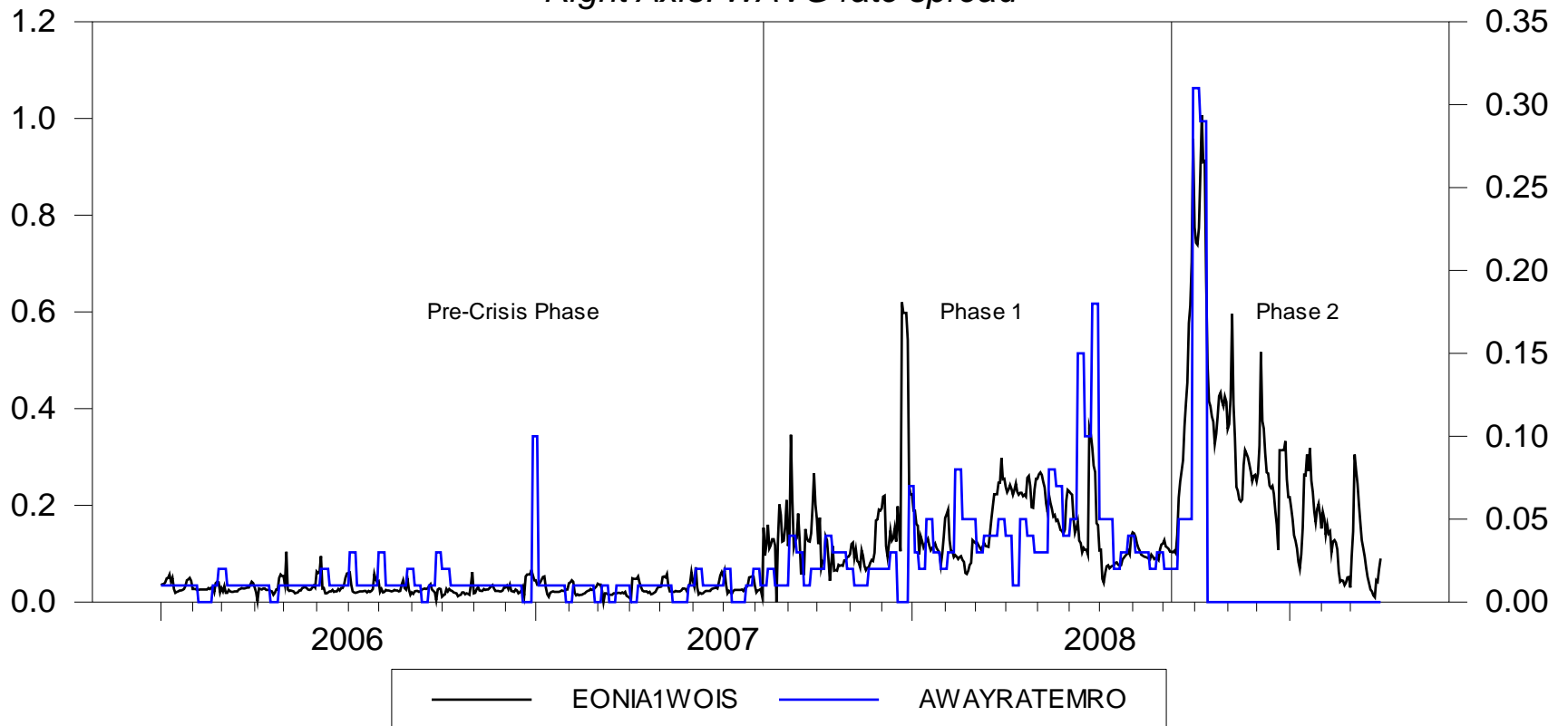
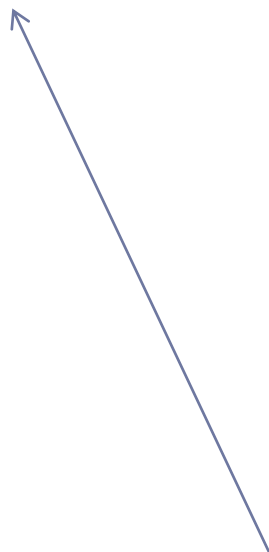# modelling I: *anticipation effect*

At event frequency (WLS...VDAX):

$$[Y - T]_t = a_0 + \sum_i b_i [A - T]_{t-i} + \sum_j c_j [B - A]_{t-j} + \sum_k d_k LIQ_{t-k} + a_1 [Y - T]_{t-1} + \eta_t$$

Relative Liquidity

Bid rate relative to Offer rate

Offer rate relative to policy rate

News Variables

Auction outcome relative to policy rate

Sign of coefficients on the repo market conditions??

Model I

$$\begin{bmatrix} A - T \\ B - A \\ LIQ \end{bmatrix}_{t-i}$$

Variable	Coeff	Std Error	T-Stat
Constant	0.106	0.833	0.127
L2(A-T)GCDE	-1.047	0.219	-4.781***
L3(A-T)GCDE	1.657	0.688	2.408**
L4(A-T)GCDE	-0.601	0.285	-2.105**
L5(A-T)GCDE	-0.352	0.360	-0.977
L2(B-A)GCDE	1.293	0.487	2.653***
L3(B-A)GCDE	-0.156	0.307	-0.509
L4(B-A)GCDE	3.622	1.133	3.195***
L5(B-A)GCDE	-0.946	0.504	-1.876*
L2LIQGCDE	-0.249	0.170	-1.462
L3LIQGCDE	-0.194	0.332	-0.585
L4LIQGCDE	0.904	0.351	2.575***
L5LIQGCDE	0.187	0.226	0.830
LGAPMRO	-0.309	0.246	-1.255
LGAPLTRO	0.052	0.078	0.661
LGAPSLTRO	0.183	0.068	2.683***
LGAPOT	0.018	0.380	0.049
L(Y-T)MRO	-1.138	0.541	-2.101**
L(Y-T)LTRO	-0.406	0.250	-1.624
L(Y-T)SLTRO	0.152	0.711	0.213
L(Y-T)OT	1.192	0.556	2.143**

Some evidence of anticipation

- Evidence of anticipation of LTRO outcomes

  - First lag negative

    - Could indicate increased short-term financing

    - Desire to wait for the benefits of the LTRO

- Lagged outcomes of previous auctions significant

  - Policy persistence

  - Persistence in liquidity risk aversion

modelling II: *Post-auction effect*

Daily observations:

$$\begin{bmatrix} A-T \\ B-A \\ LIQ \end{bmatrix}_t = \begin{bmatrix} \alpha_0 \\ \beta_0 \\ \delta_0 \end{bmatrix} + \sum_{i=1}^{I} \begin{bmatrix} \alpha_i \\ \beta_i \\ \delta_i \end{bmatrix} \begin{bmatrix} A-T \\ B-A \\ LIQ \end{bmatrix}_{t-i} + \sum_{k=l}^{K} \sum_{j=1}^{J} \begin{bmatrix} \alpha_{k,j} \\ \beta_{k,j} \\ \delta_{k,j} \end{bmatrix} \eta_{k,t-j} + \sum_{k=l}^{k} \varepsilon_{kt}$$

News shocks

(i) MROs
(ii) LTROs

Offer rate - policy rate
Bid – Offer Yield Spread
Relative Liquidity

Expect positive coefficients
If ops were damaging

Model II

Dependent:	OfferYield-Target (A-T)		Spread (B-A)		Rel Liquidity (LIQ)	
Variable	Coeff	T-Stat	Coeff	T-Stat	Coeff	T-Stat
Constant	0.754	5.234	0.186	3.147	-0.716	-6.470
L1(A-T)GCDE	0.910	21.639	-0.024	-1.442	-0.017	-0.516
L2(A-T)GCDE	-0.162	-2.881	-0.035	-1.534	0.043	0.950
L3(A-T)GCDE	-0.025	-0.568	0.001	0.082	-0.034	-0.978
L1(B-A)GCDE	-0.563	-4.715	0.914	18.668	0.114	1.250
L2(B-A)GCDE	0.134	0.878	-0.179	-2.858	0.233	1.998
L3(B-A)GCDE	-0.108	-0.849	0.072	1.384	-0.128	-1.321
L1LIQGCDE	0.101	1.717	-0.009	-0.371	0.243	5.336
L2LIQGCDE	0.015	0.254	0.008	0.338	0.112	2.396
L3LIQGCDE	0.087	1.464	-0.003	-0.150	0.107	2.316
L1NEWS...MRO	-0.555	-1.968**	0.774	6.689***	-0.203	-0.899
L2NEWS...MRO	0.673	2.025**	-0.112	-0.825	0.048	0.195
L3NEWS...MRO	-0.465	-1.384	-0.073	-0.530	0.053	0.211
L4NEWS...MRO	-0.116	-0.352	0.026	0.195	0.373	1.497
L5NEWS...MRO	0.222	0.723	-0.025	-0.202	0.012	0.055
L1NEWS...LTRO	0.245	1.046	0.103	1.077	0.129	0.740
L2NEWS...LTRO	0.192	0.811	0.330	3.410***	0.353	2.011**
L3NEWS...LTRO	0.533	2.235**	0.158	1.622	0.028	0.156
L4NEWS...LTRO	0.114	0.458	-0.334	-3.259***	-0.088	-0.469
L5NEWS...LTRO	0.251	0.994	-0.451	-4.345***	-0.196	-1.031

Impulse response function for LTRO shocks

Response to LTRO news shocks
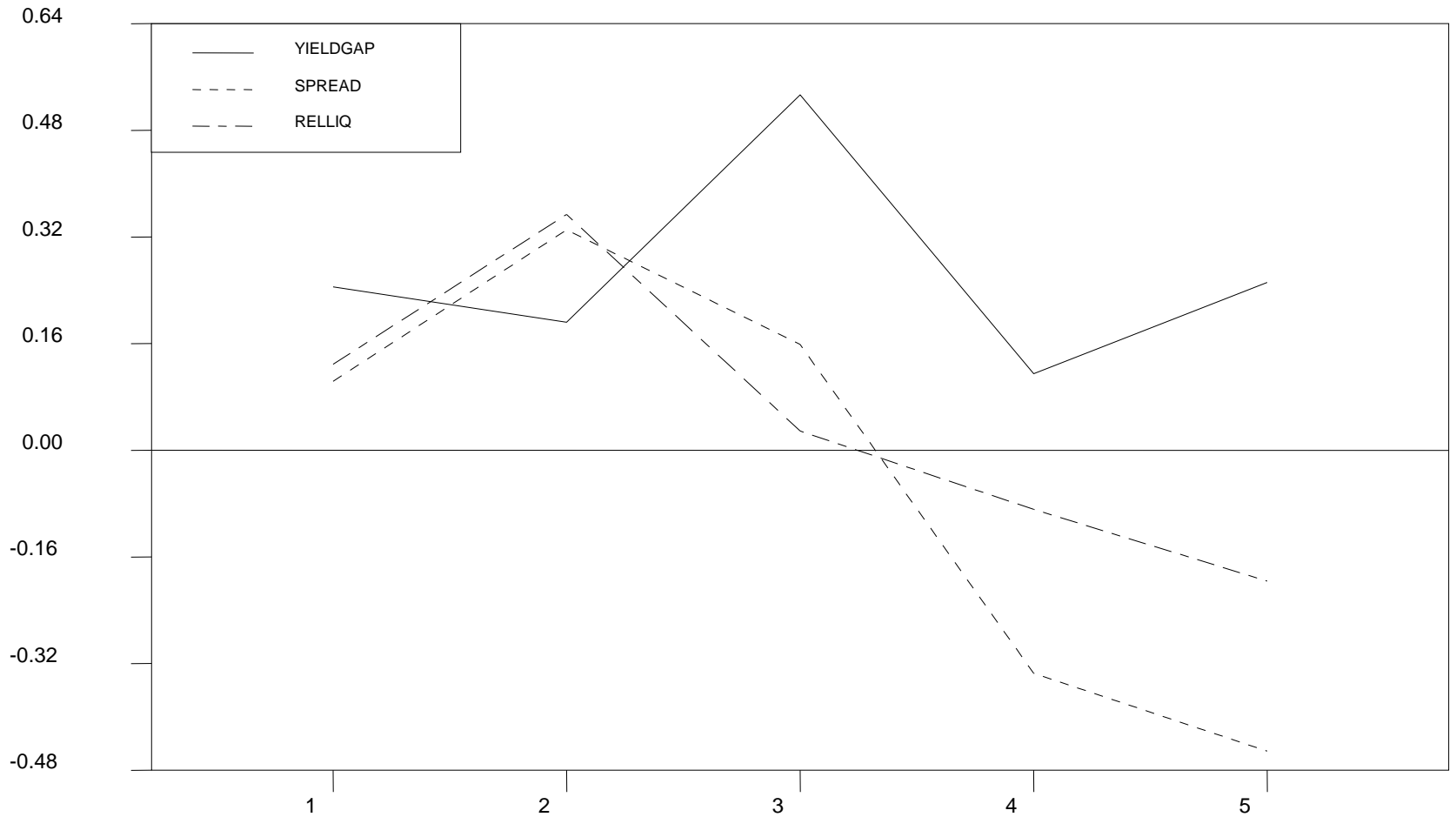
Mixed evidence on post-auction effects

- MRO news shocks have significant effects on WAVG Yield Gap and Spread
  - Mixture of positive and negative effects
- LTRO news shocks have significant effects on WAVG Yield Gap, Spread & LIQ
  - Significant deterioration in the Yield Gap and LIQ
  - Mixture of positive and negative effects on Spread

Conclusion

- ECB ops;

  – didn't relieve *under-funding risk aversion* in Crisis I

  – Full-allotment had big effect on interbank repo rate & liquidity

- Evidence;

  – interbank repo markets anticipated LTRO outcomes

  – market conditions deteriorated after LTRO not MRO surprises

  – Most effects were transitory

- Lesson;

  – Re-intermediation encouraged by fixed-rate without full allot