

Impact of non standard monetary policy on market and funding liquidity

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Federal Reserve Bank of Atlanta Financial Market
Conference: Getting a Grip on Liquidity

(Views expressed are those of the author, not necessarily those of the ECB)

1. Overview of NSMs and impact on liquidity

(A) LOLR - Possibility to access CB when market and funding liquidity dry up (broadening collateral set, “fixed rate full allotment”, ELA, longer term credit). LOLR is monetary policy NSM in the sense that absent LOLR, tightening of financial conditions in crisis would be much worse and likelihood of ZLB hit much larger. **Effects on liquidity:** (i) Prevents fire sales and thereby collapse of asset liquidity in unbalanced market; (ii) Supports maintaining access to funding markets => generally supports continued market functioning

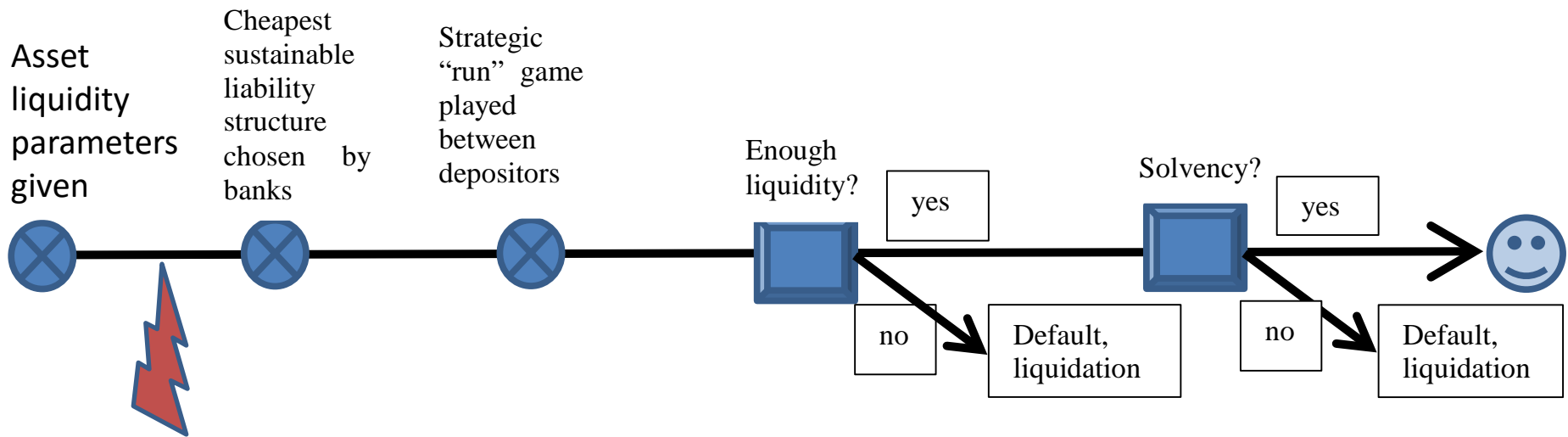
(B) LSAPs' impact on liquidity in two markets: (i) **Bond market liquidity:** positive if it supports market flows or addresses disequilibrium that would otherwise destabilise markets (latter has “market maker of last resort” elements); negative if large part of bonds removed from market; (ii) **Money market liquidity:** All banks will tend to be “over-liquid” i.e. hold large excess reserves => money market activity will shrink as all players are more and more on same side of market

(C) Negative interest rates could impair markets if (i) unsolved IT, institutional, or legal issues; (ii) investors have particular aversion against negative rates. But no other obvious reason.

Simple model of asset/funding liquidity and LOLR

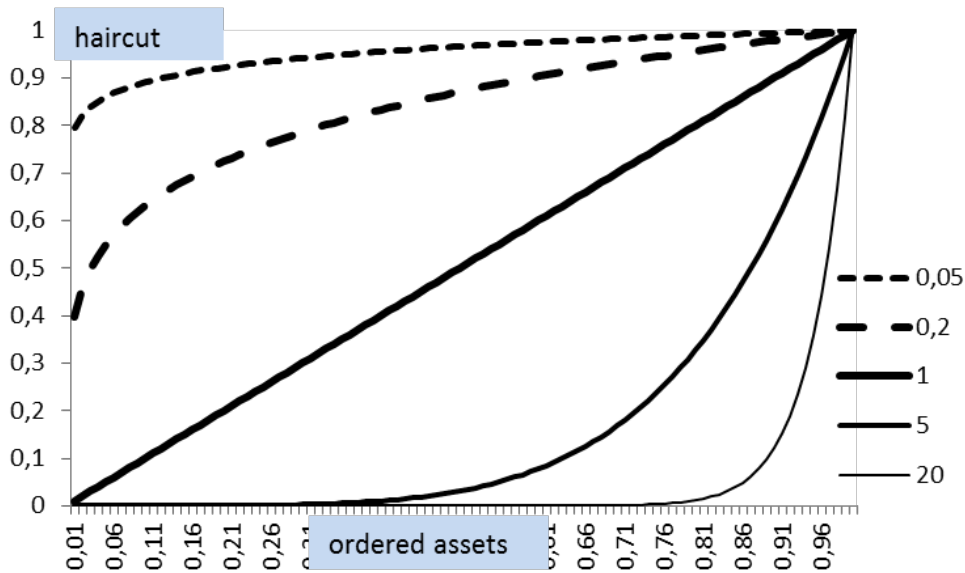
“Central bank collateral, asset fire sales, regulation and liquidity”, ECB Working Paper Series No. 1610, 11/2013

Assets		Liabilities	
Assets	1	Short term funding from Investor 1	$(1-t-e)/2$
		Short term funding from Investor 2	$(1-t-e)/2$
(Haircut function: $h(x)=x^\delta$; Asset fire sale loss function: $d(x)=x^\theta$)		Long term funding	t
		Equity	e



Two kinds of default: due to illiquidity and due to insolvency; If bank defaults for either reasons, it is immediately liquidated with associated costs and losses for remaining creditors

Asset properties: continuous power-function model



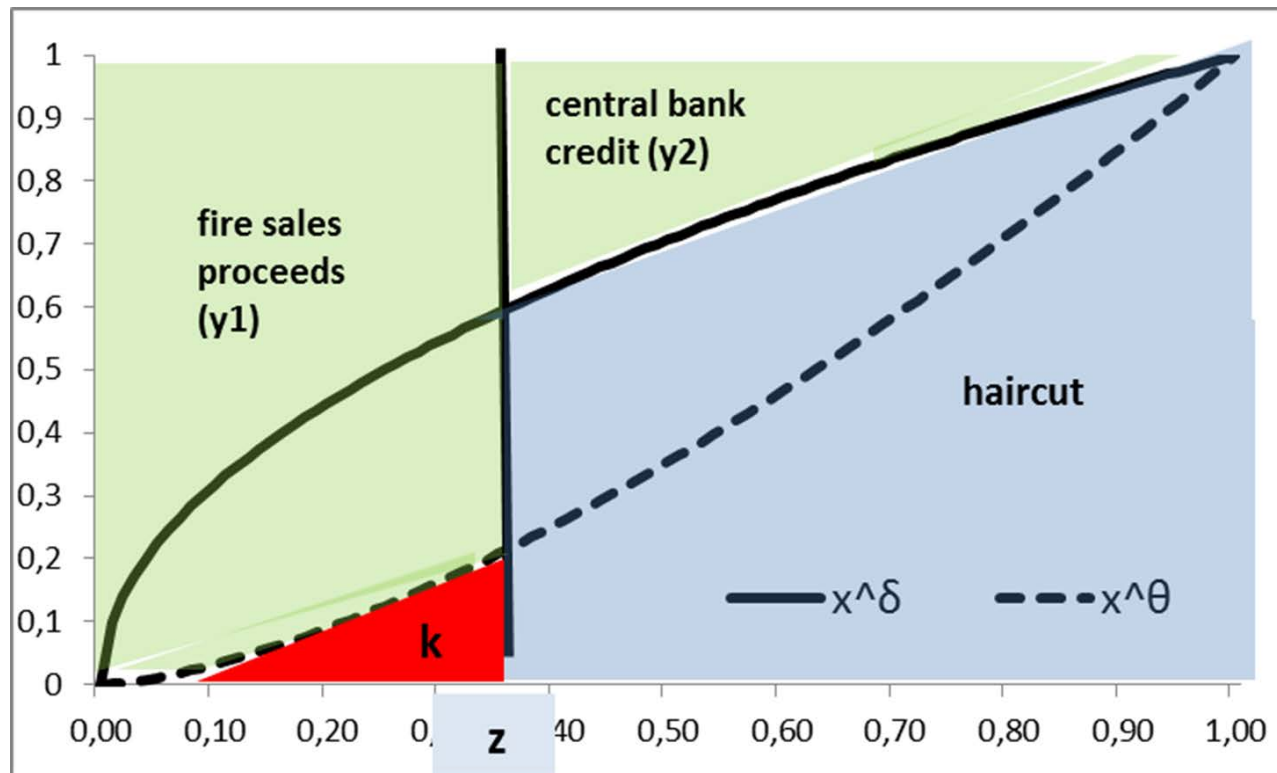
Haircut function: $h(x)=x^\delta$;
Asset fire sale loss : $d(x)=x^\theta$

**Simplistic estimation
suggests that e.g. $\delta = 0.2$
and $\theta=3$ (?)**

„Liquidity stress strategy“ (LSS) = ex ante assignment of assets either to be used if needed for fire sales, or for pledge with central bank.

**Trivial case: if $\delta > \theta$, never fire sale, LSS assigns all to CB collateral.
Interesting case: $\delta < \theta$ with reliance on both. Can be shown that optimal LSS assigns assets $[0,z]$ to fire sales and $]z,1]$ to pledge.**

Proposition: A given combination of bank liability structure (e, t) and bank asset liquidity (δ, θ) provides for a non-run equilibrium if $\exists z \in [0,1]: y_1 + y_2 \geq (1 - t - e)/2$ and $k \leq e$



Allows calculating

- “cheapest stable liability structure”. Function of $(\delta, \theta, r_D, r_T, r_E)$
- how in financial crisis the central bank needs to increase δ in case of sudden drop of θ (or a fall of equity due to a fall in asset values) to avoid:
 - Funding instability (i.e. loss of no-run equilibrium)
 - and/or banks have to make more expensive their liability structure (in particular relevant if policies have reached the zero lower bound).

Example: how collateral framework affects for given asset liquidity bank funding cost

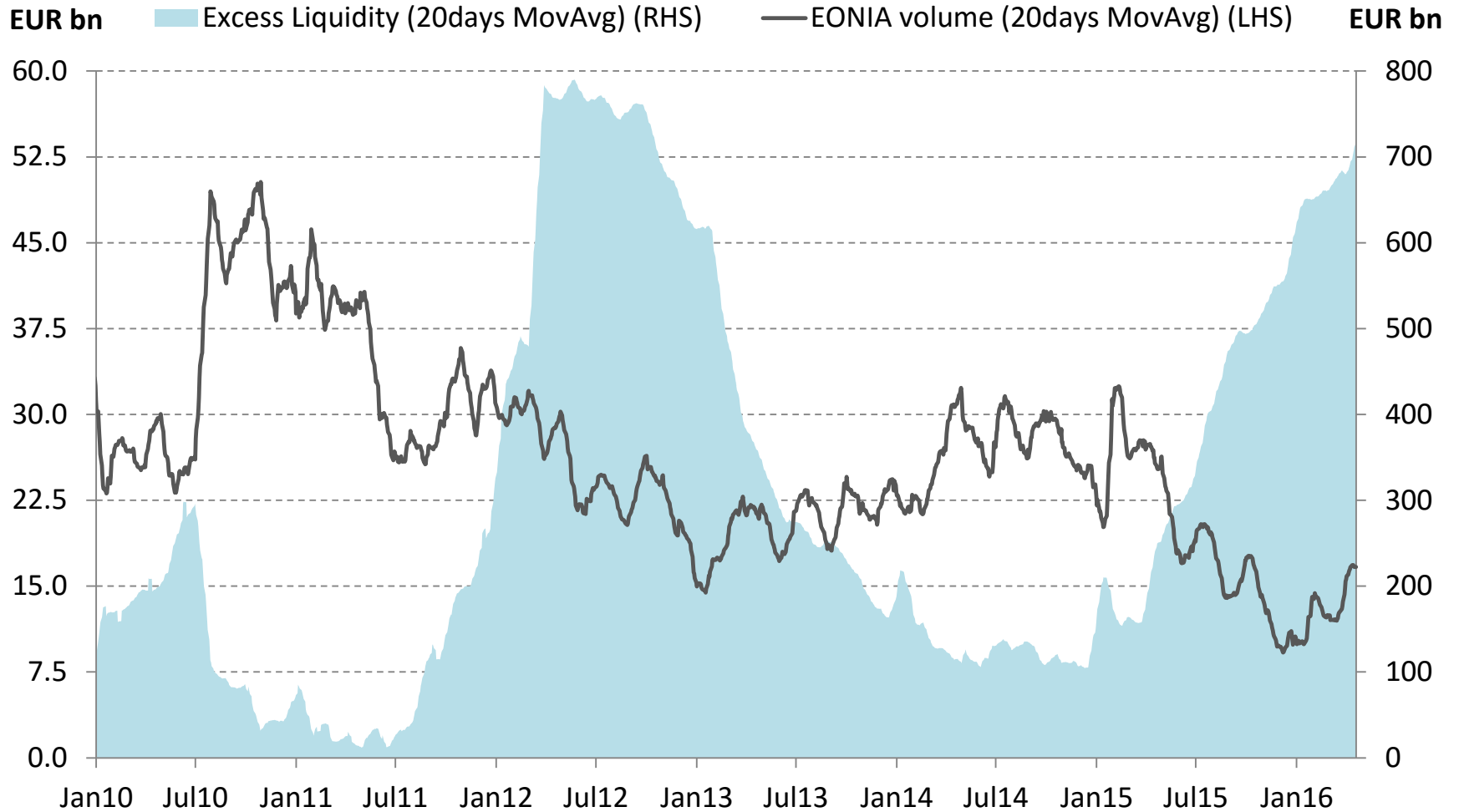
Exogenous parameters					
δ	0.01	0.1	0.2	0.5	1
Θ	1				
r_t	2%				
r_e	10%				
Results					
t	0.39	0.39	0.38	0.29	0.00
e	0.05	0.04	0.03	0.01	0.00
Implied short term funding (1-t-e)	0.56	0.57	0.59	0.70	1.00
Share of assets foreseen for fire sales (z)	0.33	0.29	0.25	0.11	0.00
Refinancing costs of bank	1.32%	1.21%	1.08%	0.64%	0.00%

The *less* restrictive the central bank collateral framework (i.e. the higher δ), the:

- higher (lower) the equilibr. share of short term funding (of long term funding, equity)
- the lower the potential role of asset fire sales relative to central bank pledging
- the lower the funding costs of banks and hence the bank lending rates

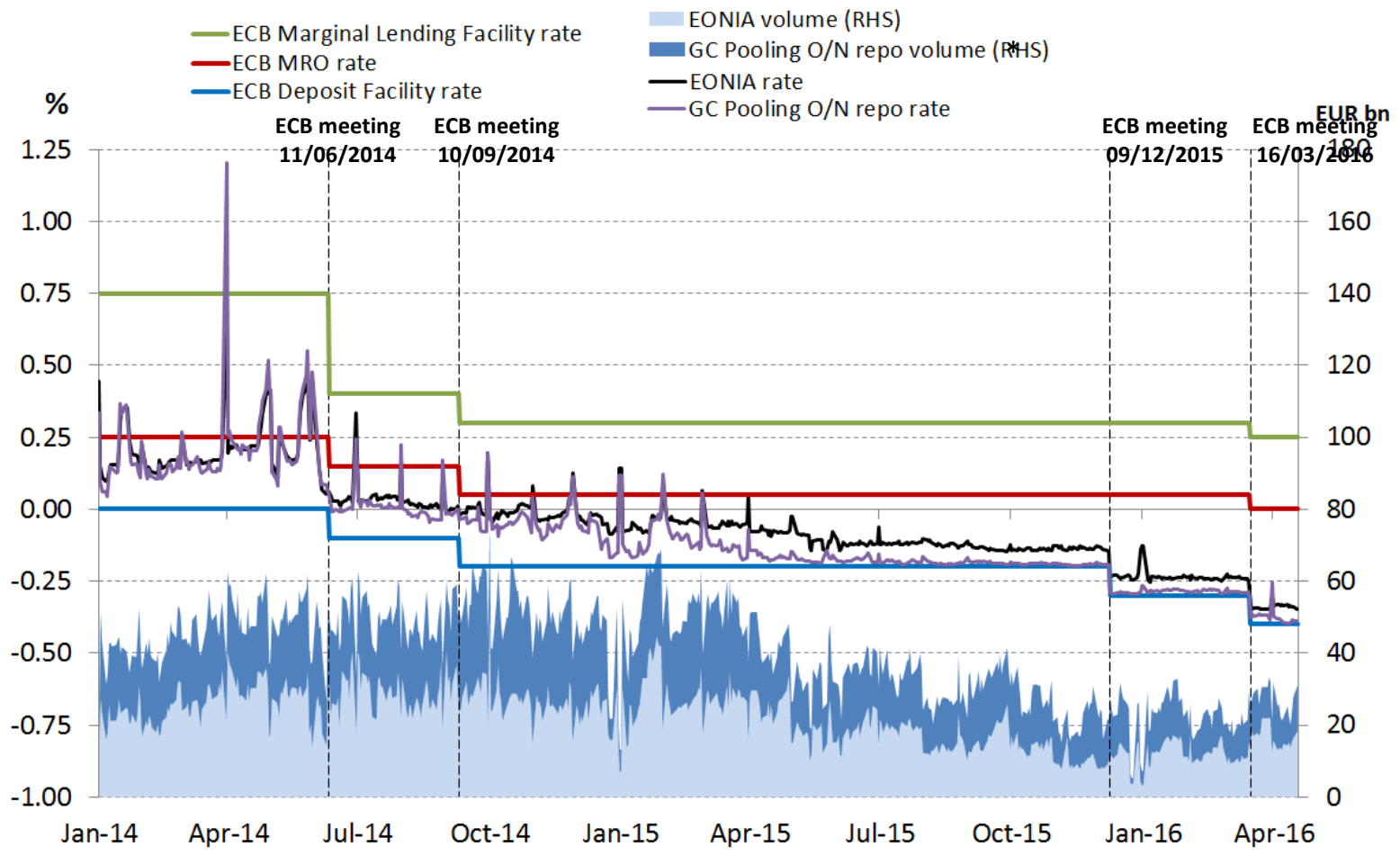
Similarly, one can show the impact of asset liquidity (θ) on bank funding costs and how δ needs to be adjusted to counterbalance a drop of θ to preserve funding stability

3. Effects of excess liquidity on EONIA volumes



Effects of negative rates on EONIA volumes (none; same for capital markets)

** **



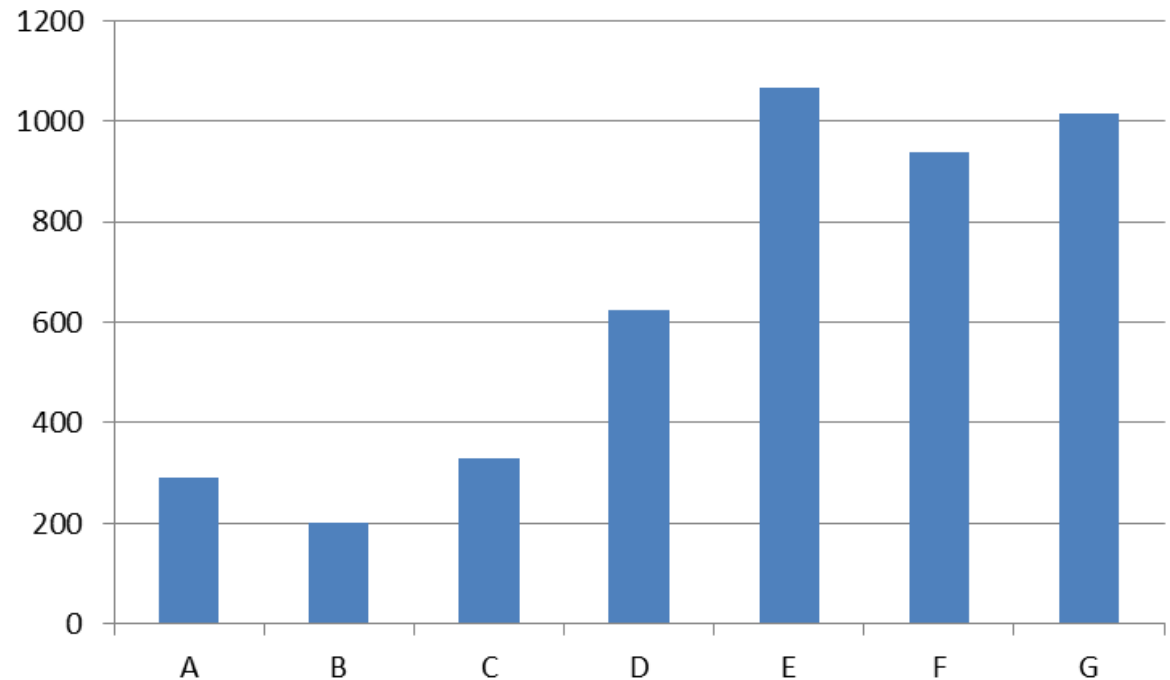
Notes:

- * The GC Pooling O/N repo rate has been computed as a volume weighted average of the GC Pooling O/N repo rate on the ECB standard basket and the GC Pooling O/N repo rate on the ECB extended basket.
- ** The volume charts (RHS) are stacked.

4. Euro area bond market liquidity and APP

Trax trade data 01/2014-09/2015. Liquidity indicator: measure of number of reported trades in each security. Band A: >250 trades per month; Band G: <5. Chart shows average number of bonds in each liquidity band. (from: Bindseil, Dragu, Duering, von Landesberger (2016), “Asset liquidity, central bank collateral and banks’ liability structure”, forthcoming working paper)

Band	Trades per month
A	> 250
B	100 – 250
C	50 – 100
D	25 – 50
E	10 – 25
F	5 - 10
G	< 5



(The monthly Trax trade data contains all deals reported by securities dealers as having been undertaken in a given month)

Euro area bond market liquidity

	to A	to B	to C	to D	to E	to F	to G
from A	87.6%	10.6%	1.2%	0.4%	0.2%	0.0%	0.0%
from B	11.3%	58.0%	23.1%	5.6%	1.6%	0.2%	0.2%
from C	0.2%	9.8%	46.5%	33.5%	8.3%	1.1%	0.6%
from D	0.0%	0.8%	14.5%	45.6%	32.9%	5.1%	1.1%
from E	0.0%	0.1%	1.8%	16.3%	48.4%	25.0%	8.3%
from F	0.0%	0.0%	0.3%	2.4%	24.5%	40.1%	32.7%
from G	0.0%	0.0%	0.0%	0.4%	7.3%	27.4%	64.9%

Monthly transition matrix above shows systematic migration to lower turnover when time passes => market liquidity is not constant property of an ISIN, not even if surrounding conditions unchanged.

Table below confirms that bid-offer spreads (taken from Bloomberg) are unlikely to have much information content in particular for assets that are rarely traded)

Bid-offer spreads (in cents) for the Trax trade frequency bands. Bid-offer spreads in cent

	> 250	100 – 250	50 – 100	25 – 50	10 – 25	5 – 10	< 5
Coverage (rhs)	99.3%	98.7%	97.0%	96.9%	94.7%	88.5%	73.5%
Bid/Offer spread	2.37	2.00	8.01	6.03	4.71	4.47	1.38

Matching of ECB liquidity categories and trading frequency classes

Credit Quality	Residual Maturity (years)	Haircut in % by Asset Class (*)								
		L1A - Central Government Bonds		L1B Regional Gov. Bonds, Supranational and Jumbos		L1C Covered Bonds, Corporate bonds		L1D Unsecured bank bonds		L1E ABS
		Fixed Coupon	Zero Coupon	Fixed Coupon	Zero Coupon	Fixed Coupon	Zero Coupon	Fixed Coupon	Zero Coupon	
AAA to A-	0-1	0.5	0.5	1.0	1.0	1.0	1.0	6.5	6.5	10.0
	1-3	1.0	2.0	1.5	2.5	2.0	3.0	8.5	9.0	
	3-5	1.5	2.5	2.5	3.5	3.0	4.5	11.0	11.5	
	5-7	2.0	3.0	3.5	4.5	4.5	6.0	12.5	13.5	
	7-10	3.0	4.0	4.5	6.5	6.0	8.0	14.0	15.5	
	>10	5.0	7.0	8.0	10.5	9.0	13.0	17.0	22.5	
BBB+ to BBB-	0-1	6.0	6.0	7.0	7.0	8.0	8.0	13.0	13.0	22.0*
	1-3	7.0	8.0	10.0	14.5	15.0	16.5	24.5	26.5	
	3-5	9.0	10.0	15.5	20.5	22.5	25.0	32.5	36.5	
	5-7	10.0	11.5	16.0	22.0	26.0	30.0	36.0	40.0	
	7-10	11.5	13.0	18.5	27.5	27.0	32.5	37.0	42.5	
	>10	13.0	16.0	22.5	33.0	27.5	35.0	37.5	44.0	

* Only Eligible in the temporary framework

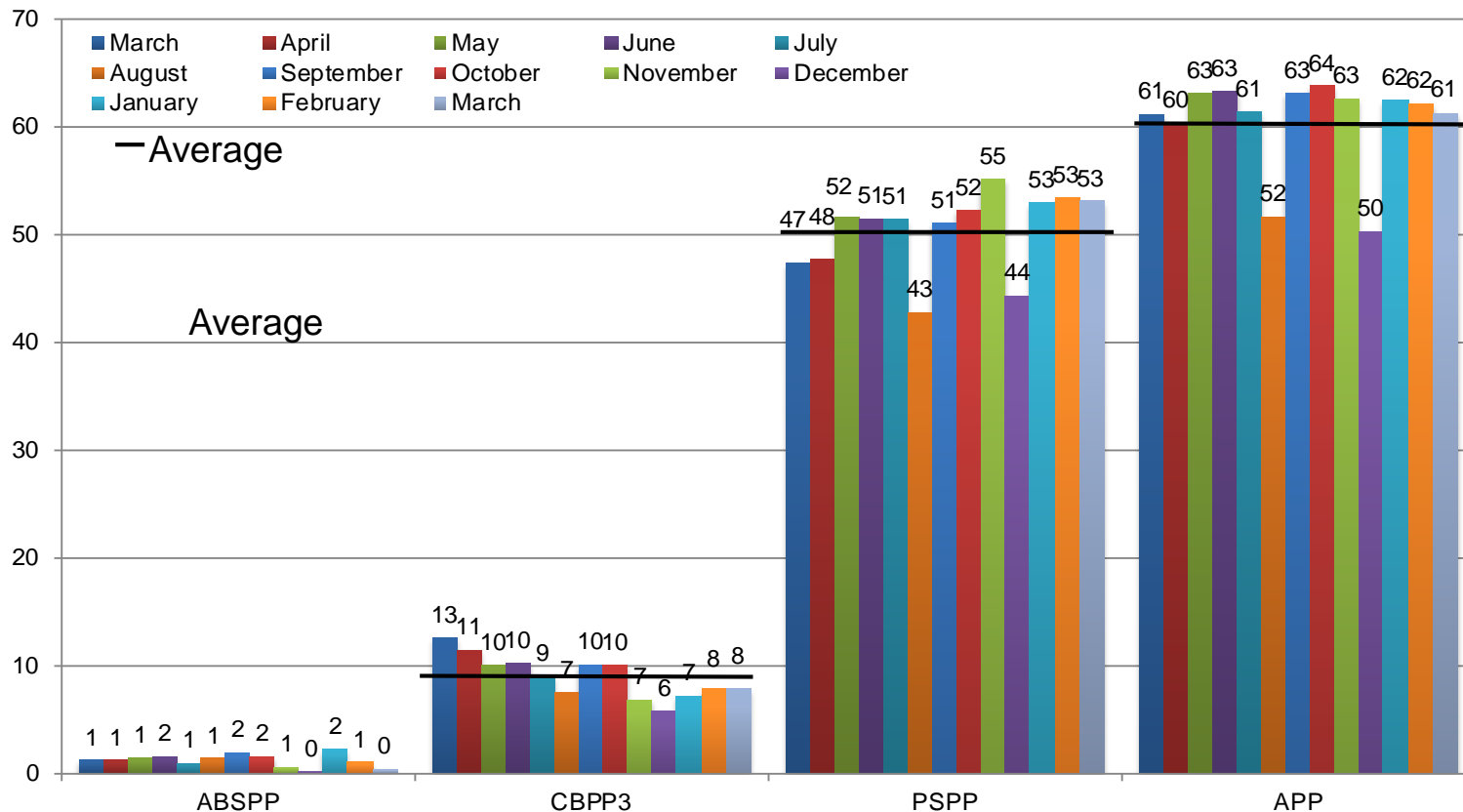
Table below matches the trade band categories with the ECB liquidity categories (table on left). Confirms that the higher the liquidity category, the more likely the securities are frequently traded.

Liquidity categ	A	B	C	D	E	F	G	H	Total
L1A	220	163	59	55	118	184	263	1187	2249
L1B		3	12	57	146	237	414	2724	3593
L1C	3	15	60	141	322	308	393	5837	7079
L1D	13	52	148	251	434	338	466	17949	19651
L1E				1	6	17	112	775	911
Grand Total	236	233	279	505	1026	1084	1648	28472	33483

Of course, being traded rarely does not mean that an asset is necessarily difficult to be liquidated (example: Government bonds from for instance Luxembourg, Malta or Slovakia will trade infrequently, but liquidating a portfolio containing them will nevertheless be unproblematic)

ECB's Asset Purchase Programme (APP)

(in EUR bn)



PSPP size adjusts according to CBPP3 and ABSPP pace of purchases

Asset liquidity is relevant not only if one needs to sell quickly, but also if one has to buy very large amounts in a given time period! Eurosystem purchases mainly done in “open market” i.e. though bilateral trades, with only limited amounts purchased via specific auctions.

APP allows collecting lot of real-world experience on liquidity

- Until a trade is actually requested, quotes mean very little
- Here, A wins with an offer of 102.107 while streaming 102.210 in smaller size

BUY EUR 5,000 LBBW 0.500 04/08/22

Trade Date: Trade Time: 11:27:08 MET
 Composite: EUR 101.853/102.241 0.213-0.153 ISIN: DE000LB01ZU3
 Benchmark: 112.276-309 -0.153 DBR 1.750 04/07/22

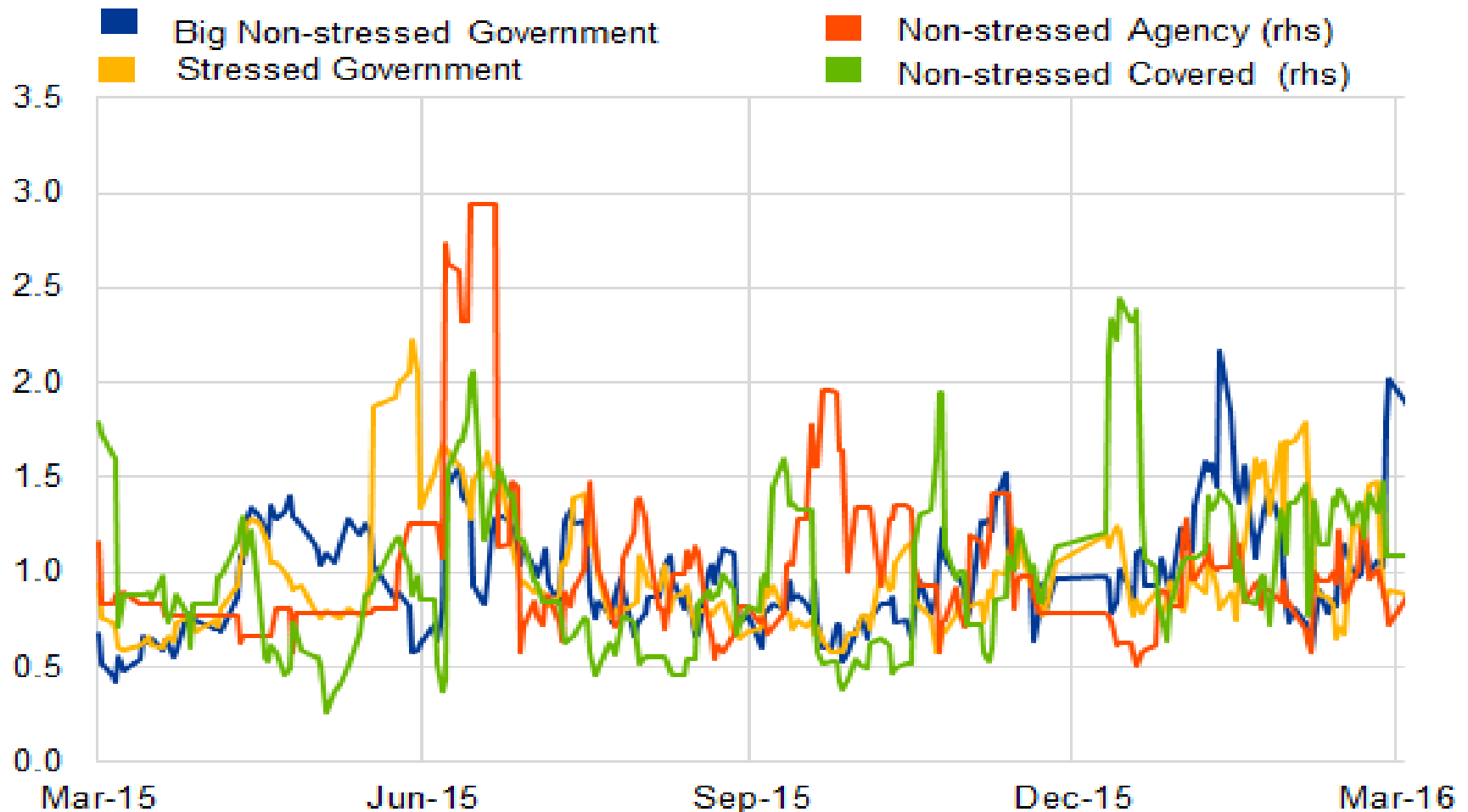
Trd	Dir	State	Qty (000)	Zspd	ASW Spd	Bmrk Sprd	Yield	Price EUR	Action	End	Time
27	A	Accepted	5,000	-7.3	-7.2	33.3	0.174	102.107			0:01
26	D	Pass	5,000								
26	B	Dir-Quote	5,000	-9.1	-9.0	31.5	0.156	102.224	LIFT	END	
29	E	Dir-QteUpd	5,000	-12.3	-12.2	28.2	0.123	102.435	LIFT	END	0:01
27	C	Dir-Quote	5,000	-10.4	-10.3	30.1	0.142	102.311	LIFT	END	

Dealer Streaming Prices

Dealer	Offer Price	Qty/O (000)	Off Spd	ASW/O	Ispd/O	Zspd/O	Yield/O	Update
B	102.177		32.2	-8.3	-7.7	-7.7	0.163	10:27:12
A	102.210	1,000	31.6	-8.9	-8.3	-8.9	0.158	10:27:23
C	102.210		31.7	-9.1	-8.5	-8.5	0.158	10:27:12
D	102.245		31.0	-9.6	-9.0	-9.7	0.152	10:27:26
E	102.423	5,000	28.3	-12.3	-11.7	-12.4	0.125	10:27:20

- E streams 102.423 for the same trade size but shows 102.435 when asked for quote, B streams 102.177 but shows 102.224
- **Lesson: Streaming quotes are...well, just quotes**

Liquidity measure: spread to second best binding quote in ECB's APP(ECB purchases)



Source: ECB calculations.

Note: all series indexed to an average level equal to 1.

Reducing possible negative effects of APP on bond market liquidity

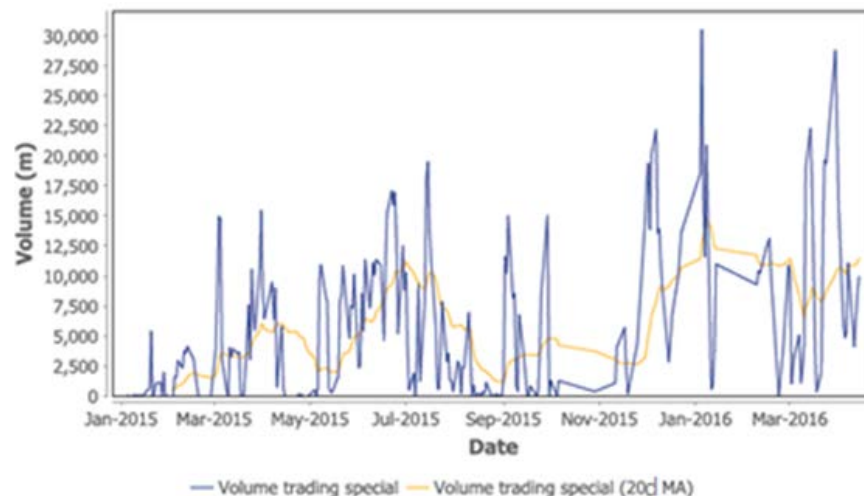
- Issue share limit: 33%
- Elastic buyer with flexibility at ISIN level (“liquidity provider”)
- Avoid buying bonds trading special in repo markets
- Bonds held under the APP made available for **securities lending** by ECB and NCBs in decentralised manner. Priced as backstop. Realised lending volumes relative to total APP holdings remain so far rather low. Evidence that APP (and particularly PSPP) has not had so far any disruptive impact on the market. More information:

<https://www.ecb.europa.eu/mopo/implement/omt/lending/html/index.en.html>

Specialness evolution monitoring tools

Jurisdiction	Holdings PSPP & SMP	ISIN	20160408	20160407	20160406	20160405	20160404	...	Average daily volumes traded (EUR millions)
XX	%	XX1234A12345	-0.32	-0.45	-0.30	-0.35	-0.27	###	X
XX	%	XX1234A12345	-0.39	-0.37	-0.25	-0.55	-0.28	###	X
XX	%	XX1234A12345	-0.24	-0.33	-0.28	-0.37	-0.38	###	X
XX	%	XX1234A12345	-0.36	-0.51	-0.74	-0.66	-0.45	###	X
XX	%	XX1234A12345	-0.35	-0.54	-0.58	-0.34	-0.26	###	X
XX	%	XX1234A12345	-0.55	-0.46	-0.42	-0.24	-0.57	###	X
XX	%	XX1234A12345	-0.26	-0.30	-0.31	-0.27	-0.50	###	X
XX	%	XX1234A12345	-0.26	-0.23	-0.23	-0.24	-0.26	###	X
XX	%	XX1234A12345	-0.50	-0.40	-0.37	-0.67	-0.39	###	X
XX	%	XX1234A12345	-0.29	-0.34	-0.32	-0.59	-0.35	###	X
XX	%	XX1234A12345	-0.24			-0.50	-0.65	###	X
XX	%	XX1234A12345	-0.26	-0.52	-0.45	-0.40	-0.55	###	X
XX	%	XX1234A12345	-0.24	-0.29	-0.26	-0.32	-0.30	###	X

Volume of German government bonds trading special



Conclusions

- **Market liquidity matters for monetary policy:**
 - Deterioration of market liquidity can destabilise banks' (and other leveraged financial entities') funding liquidity and increase financial intermediation spreads so as to tighten financial conditions, which is particularly an issue if ZLB is not remote
 - As money market activity affects measurability of the operational target
 - As bond market liquidity may affect the feasibility of LSAPs
- **Non standard policy measures matter for market liquidity:**
 - Adequate LOLR adjustment in financial crisis can restore bank funding liquidity and prevent asset fire sales spiral and its second round effects on asset liquidity
 - Excess liquidity injected through LSAPs reduces money market turnover
 - LSAPs and “market maker of last resort” (MMLR) can support market liquidity. LSAPs if conducted awkwardly can also reduce market liquidity => need to specify LSAPs towards (i) market neutrality and (ii) re-channelling of securities to market through securities lending