

Workshop on

Implementing monetary policy post-crisis: What have we learned? What do we need to know?

**Organized by Columbia University SIPA
and the Federal Reserve Bank of New York
May 4, 2016**

How should central banks steer money market interest rates?

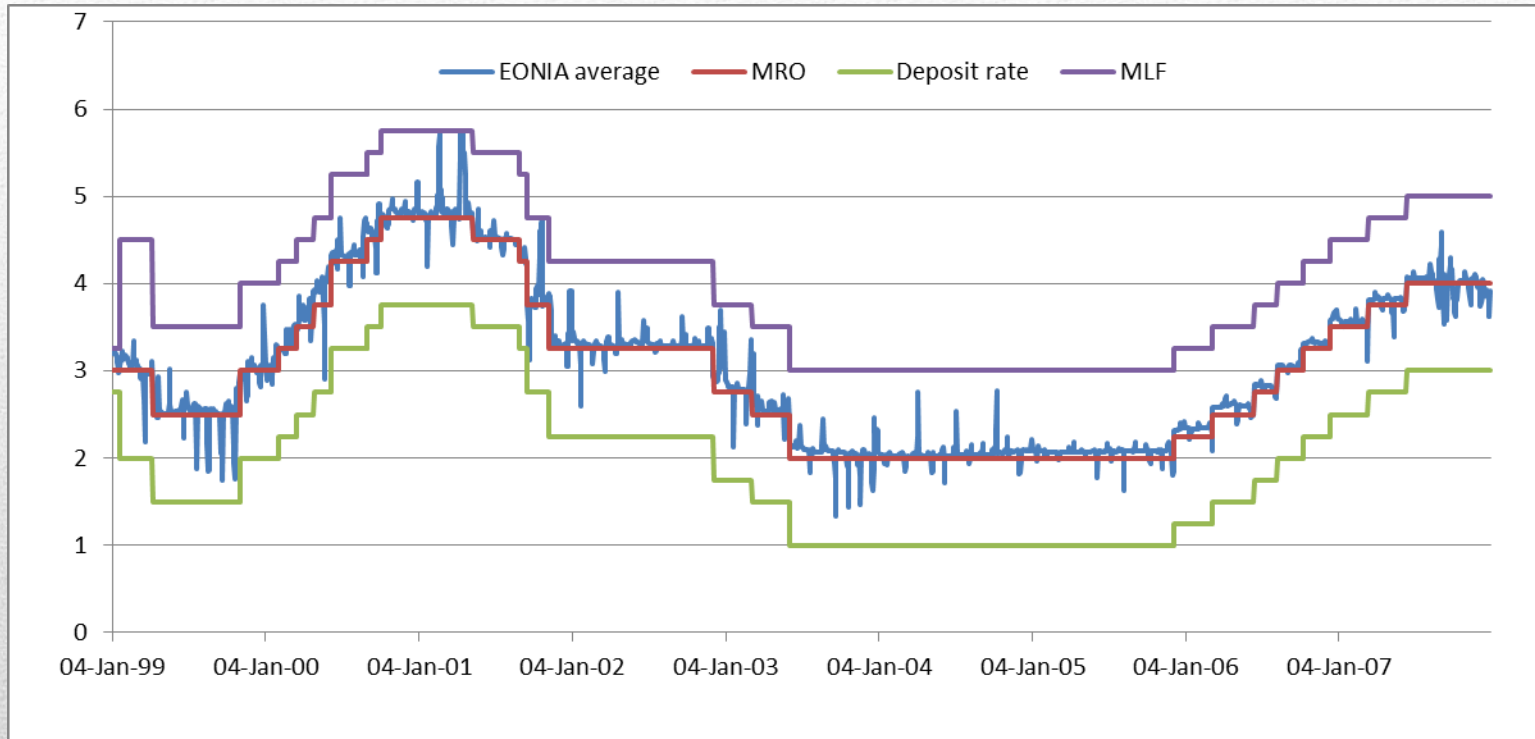
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*This presentation represents work in progress. The section on derivative control of interest rate is joint work with Juliusz Jablecki
Prepared with the assistance of Madalina Norocea
and Piero Esposito

The past

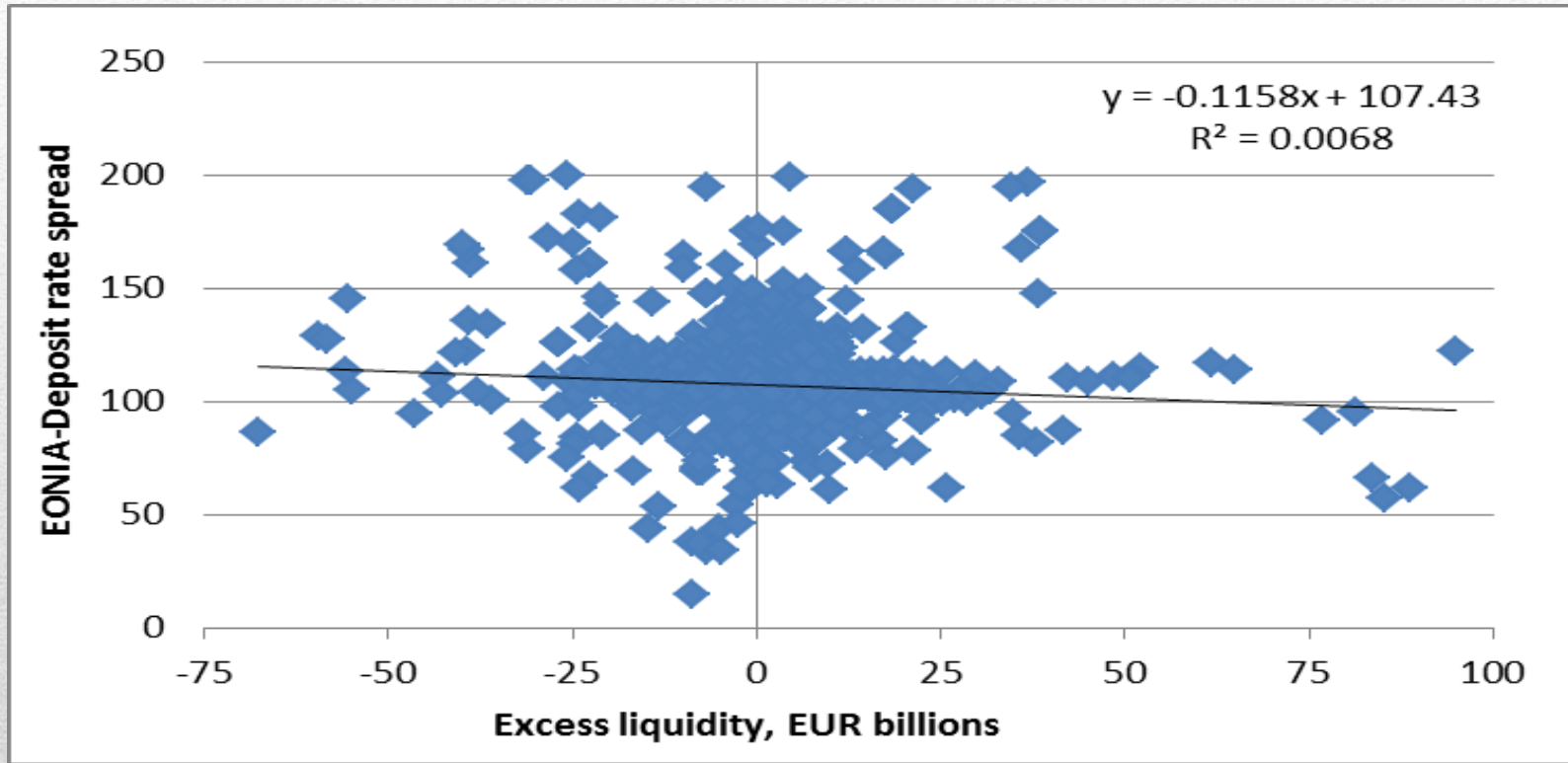
- Pre-August 2007

The ECB corridor before the crisis



- O/N rate in the middle of the corridor

Excess of liquidity and spreads before the crisis



- Excess liquidity and spread O/N MRO rate around zero

Interest rates within a corridor system

$$r^t = E_t(r^T) = P_l R^l + P_s R^s$$

Where

r^t is the market interest rate on day t

r^T is the interest rate at the end of the maintenance period

E^t is the expectation operator based on information available on day t

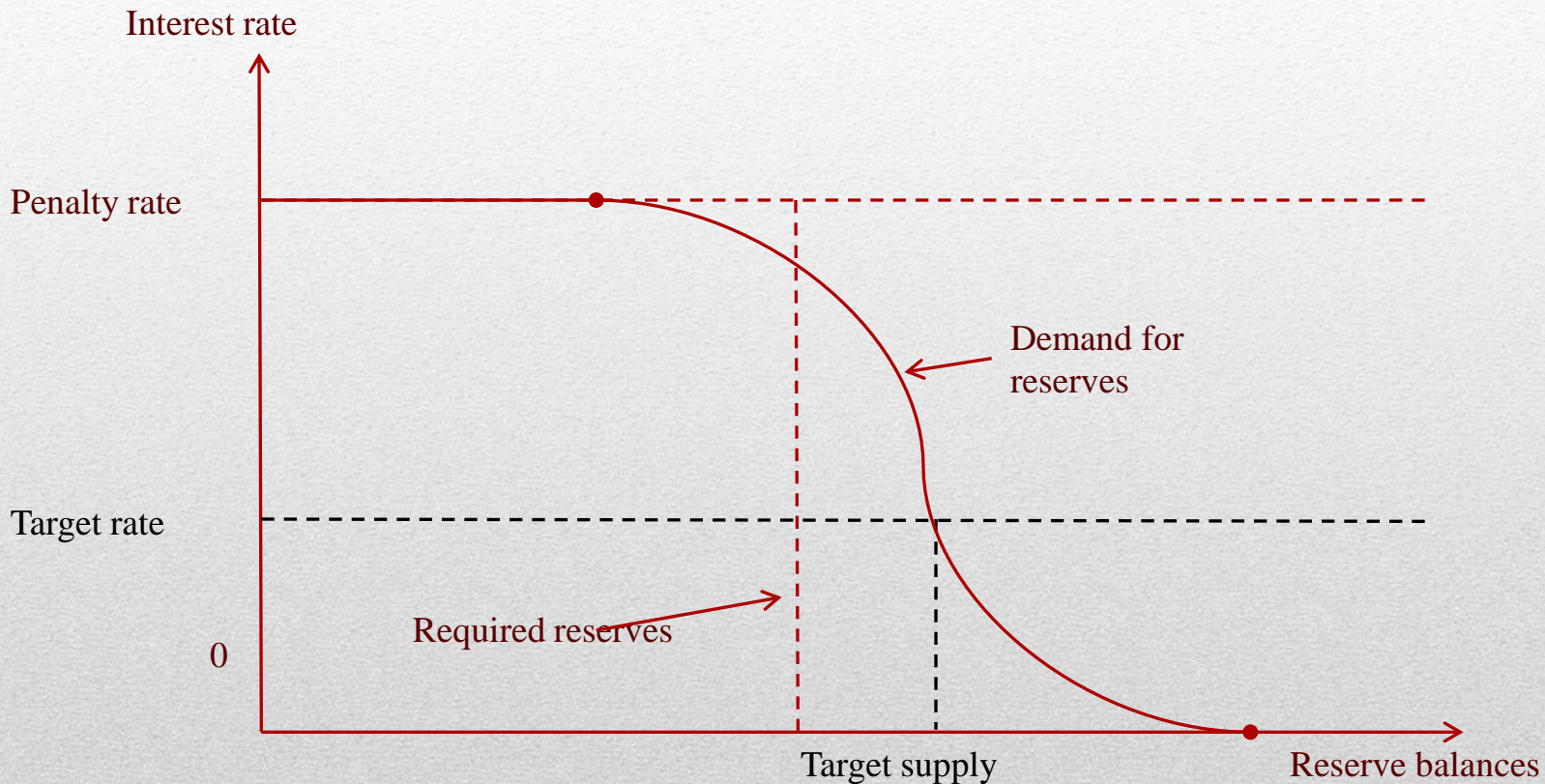
R^l is the rate applying when banks are long on liquidity and depositing it with the ECB

P_l is the probability of banks being long on liquidity at the end of the maintenance period

R^s is the rate when banks are short of liquidity and borrowing from the ECB

P_s is the probability of banks being short on liquidity at the end of the maintenance period.

Monetary policy implementation in the United States*



Central banks balance sheets broad vs. narrow frameworks

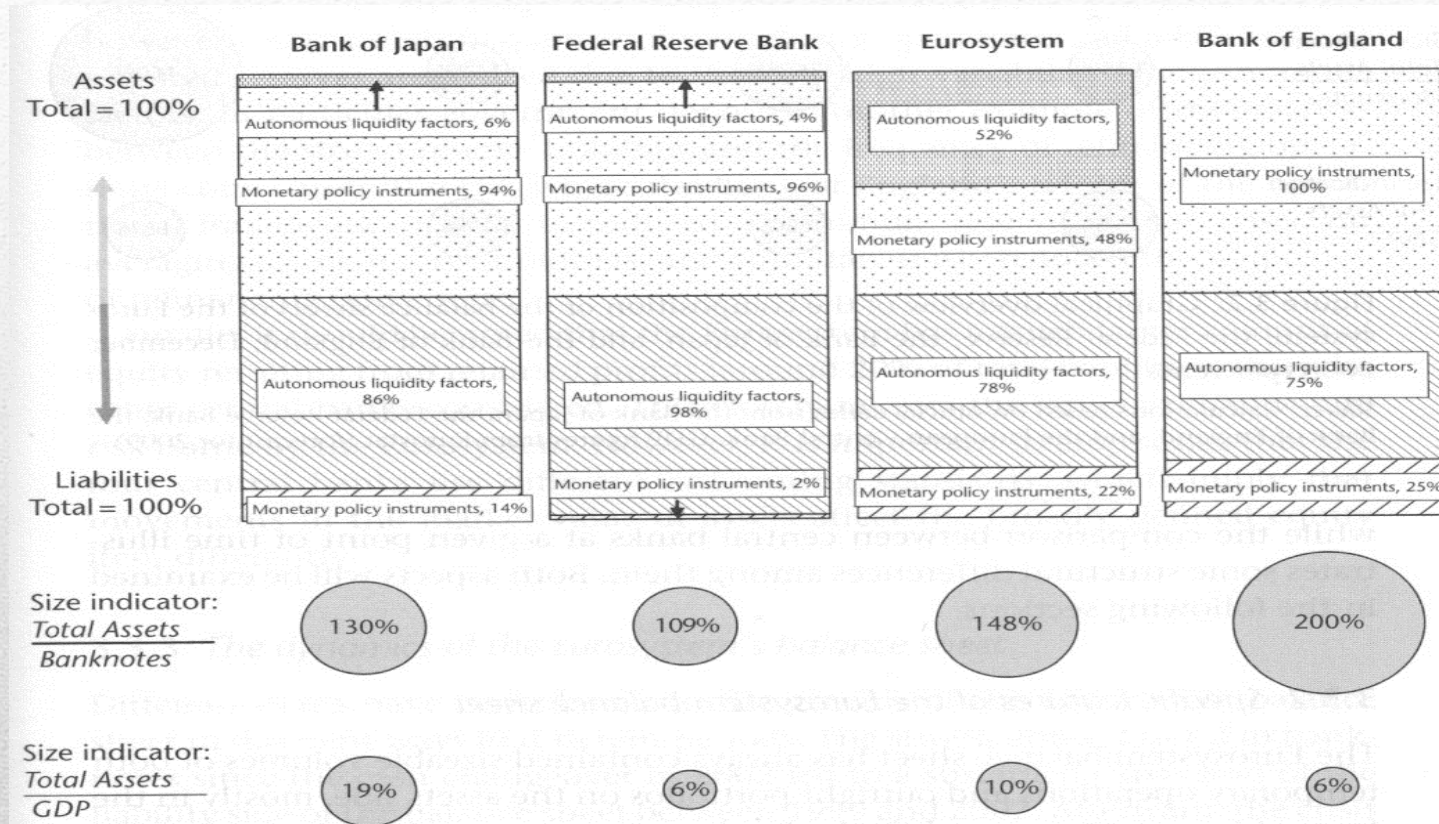


Figure 3.1: Graphical overview of the composition of the balance sheets of the Eurosystem, the Federal Reserve, the Bank of Japan, and the Bank of England, June 2007 (per cent)

Source: Calculations based on official series from the Bank of Japan, the Federal Reserve Bank, the Bank of England, and the European Central Bank. GDP figures from Eurostat.

Precision in interest rate control I

Functioning of the Eurosystem framework since 1999

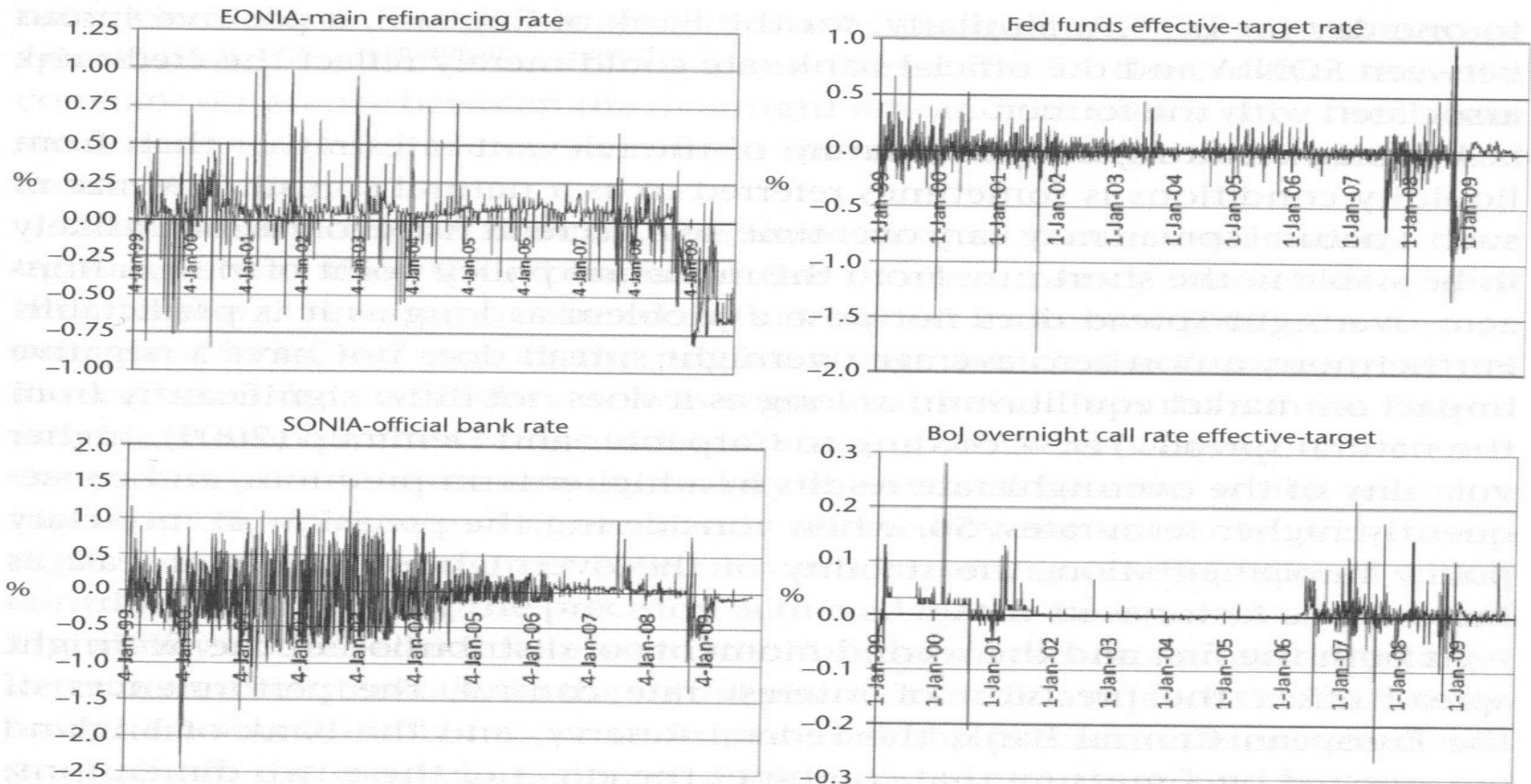


Figure 3.15: The overnight spreads, 1999–2009 (per cent)

Sources: European Central Bank, Federal Reserve, Bank of England, Bank of Japan, and authors' calculations.

Precision in interest rate control II

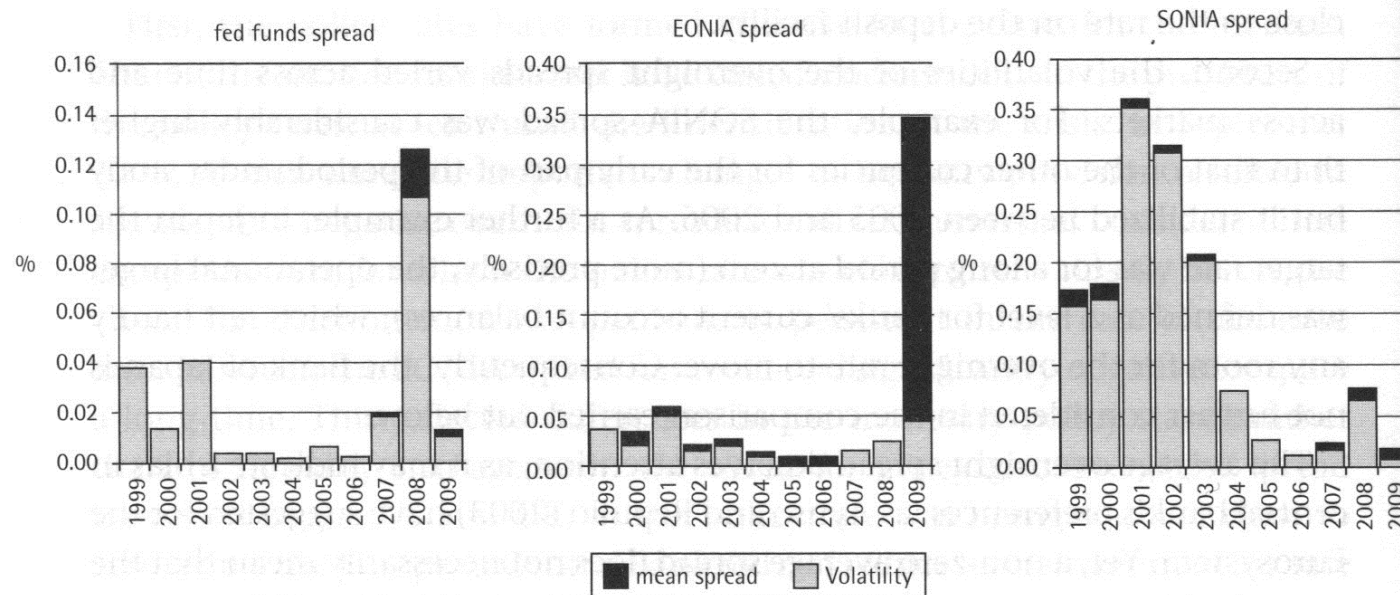


Figure 3.16: Precision in interest rate control (average squared differences between daily overnight and policy rates), 1999–2009 (per cent)

Sources: European Central Bank, Federal Reserve, Bank of England, and authors' calculations.

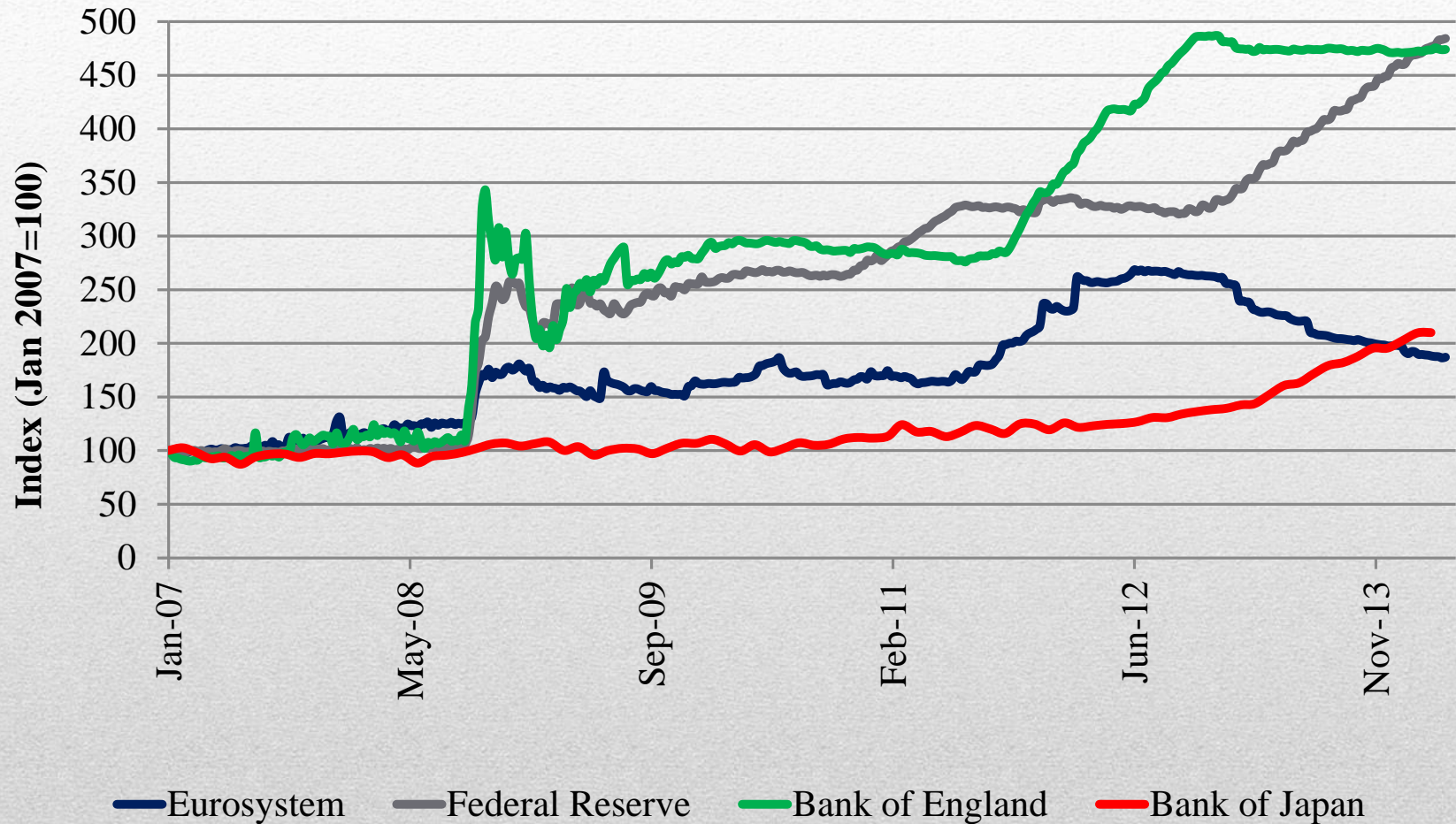
- US and €-area with comparable precision, Japan more precise, UK less.



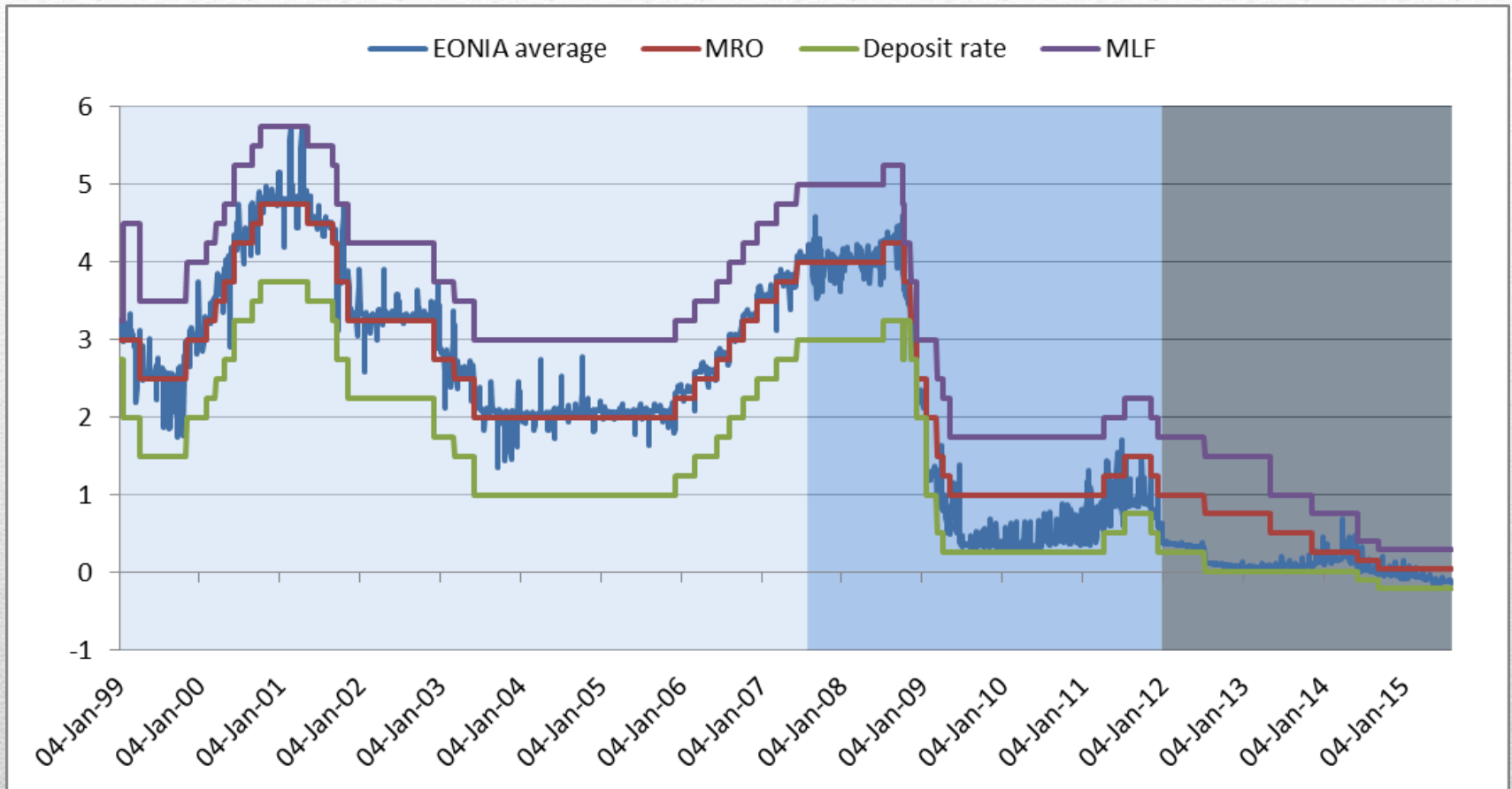
The Present

- **After August 2007**

Central bank balance sheets

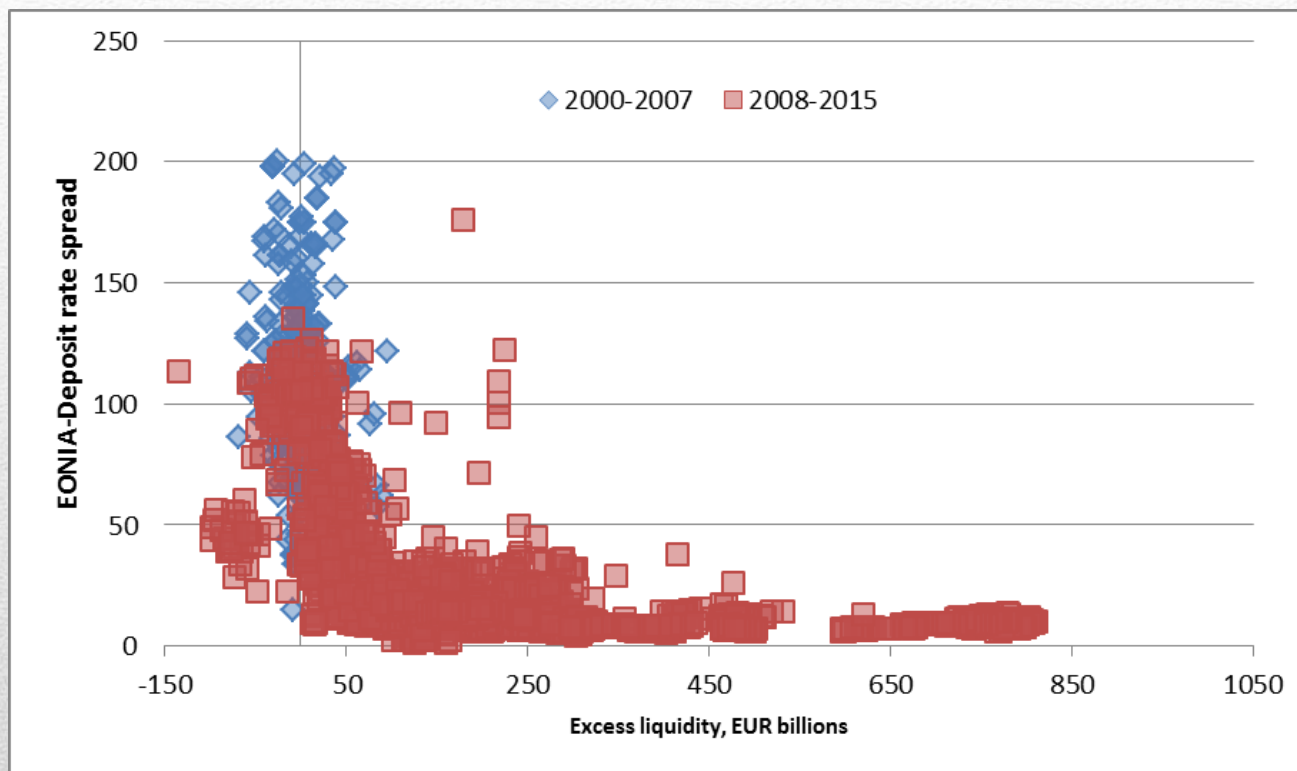


The ECB corridor after the crisis



First volatility of O/N, then compression onto the floor of the corridor

Excess of liquidity after the crisis



- Huge amount of liquidity pushing O/N to the bottom of the corridor

Fundamental equation: special case

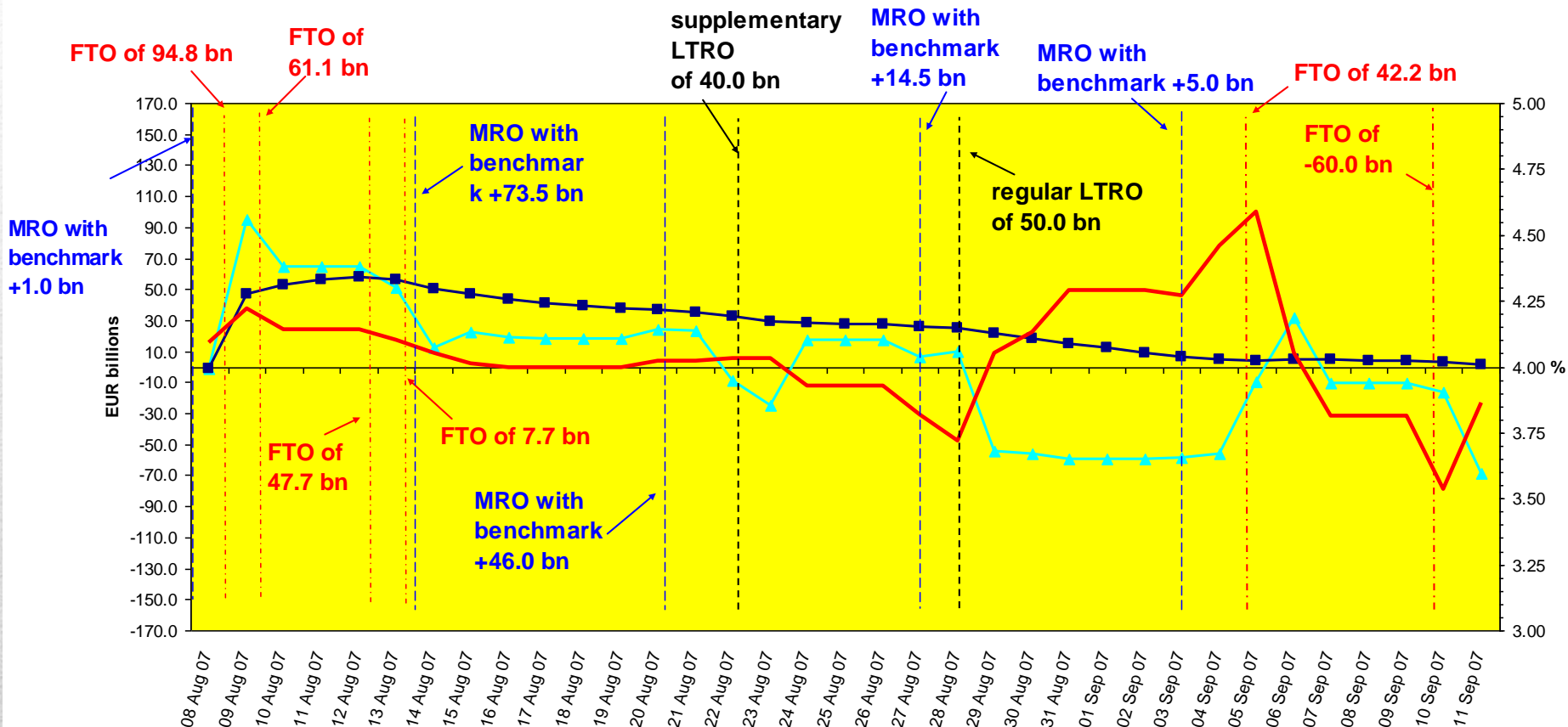
$$r^t = E_t(r^T) = P_l R^l + P_s R^s$$

$$r^t = E_t(r^T) = R^l$$

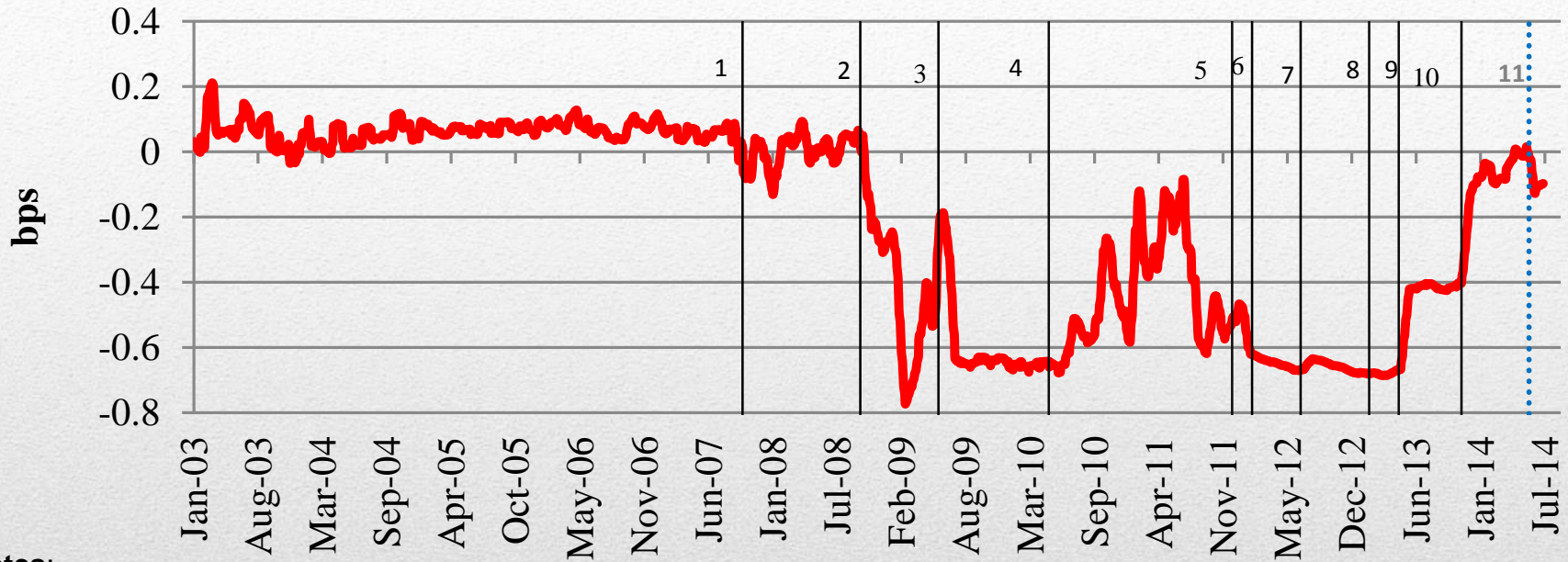
Maintenance period

8 August – 11 September 2007

▲ Daily reserve surplus/deficit (left-hand scale)
 ■ Average daily reserve surplus (left-hand scale)
 — EONIA (right-hand scale)



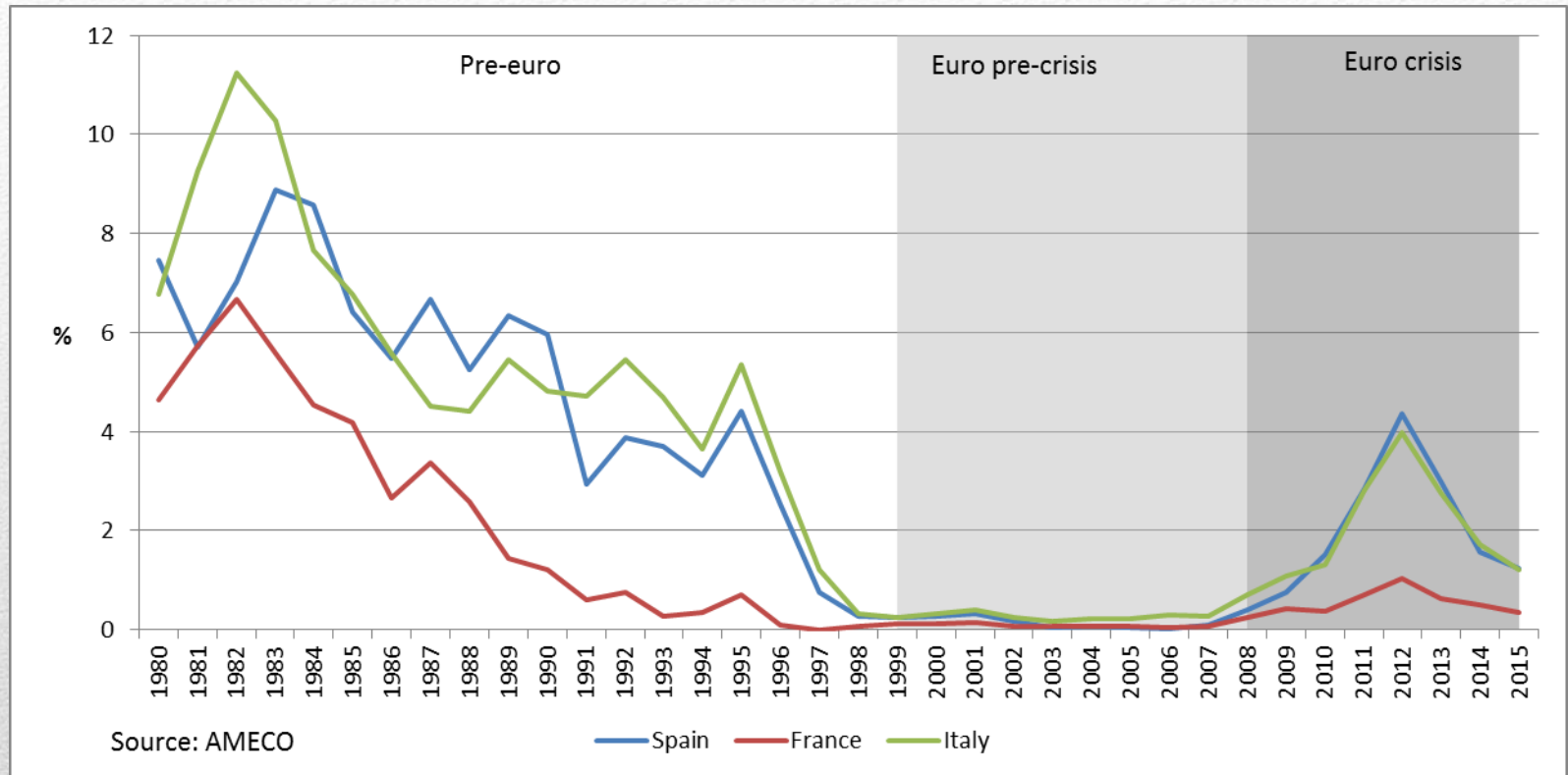
EONIA-MRO spread



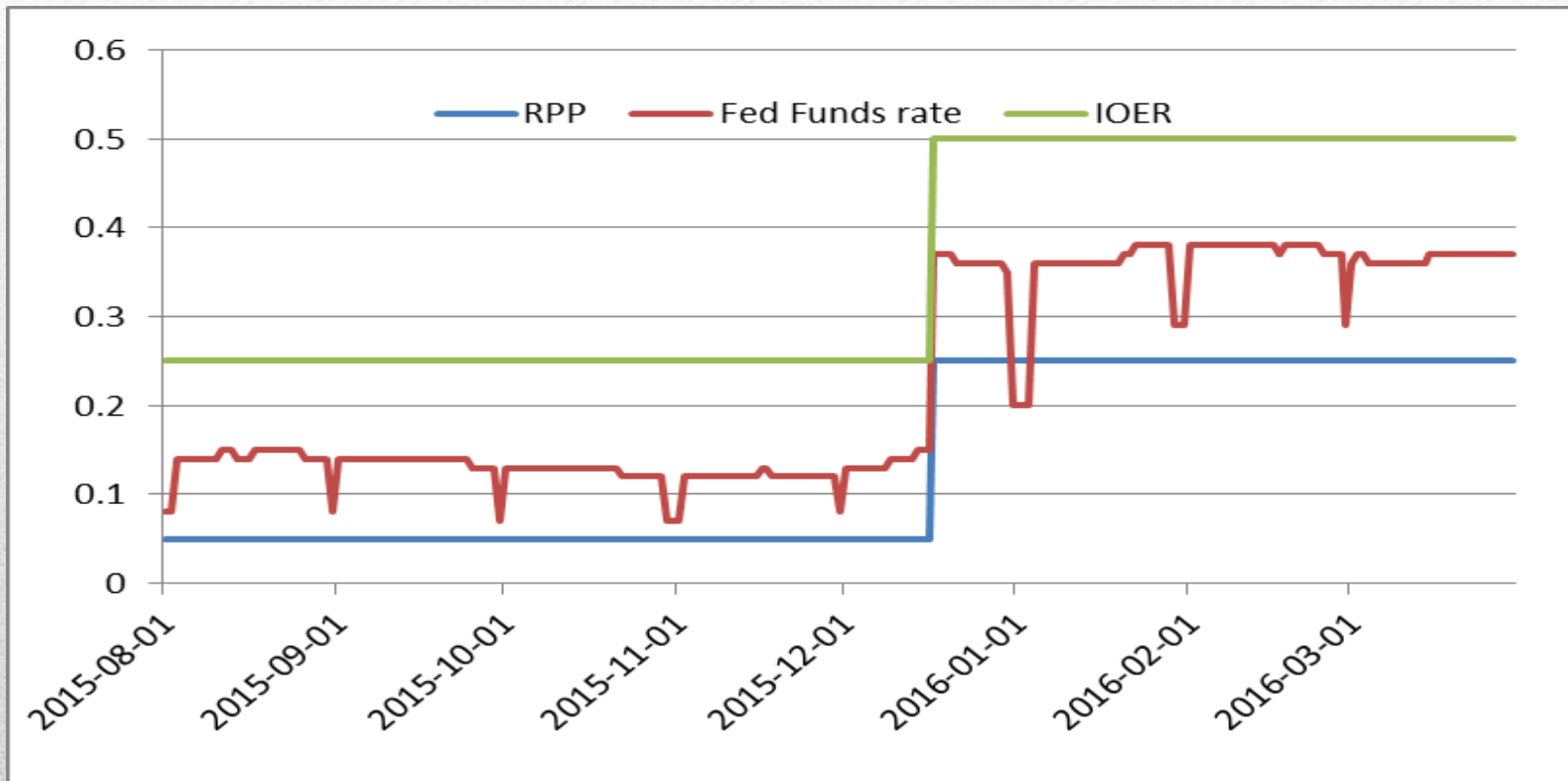
Notes:

- (1) Lehman Brothers Collapse; Injection of liquidity via fine tuning operations
- (2) Narrowing of the corridor & Full allotment at fixed rate
- (3) 1st 1 year LTRO
- (4) Start of SMP
- (5) & (6) The 3 year LTROs
- (7) Deposit rate cut to 0
- (8) Start of 3 yr LTROs early repayment
- (9) MRO rate cut
- (10) MRO rate cut to 0.25
- (11) Negative deposit rate

Spread between peripheral and German 10y bonds



The new FED corridor approach



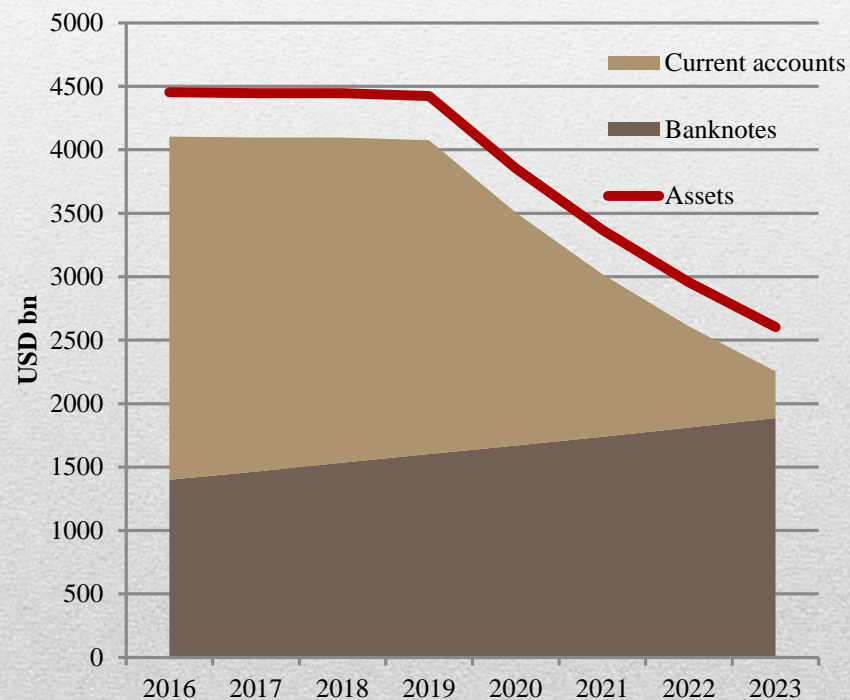
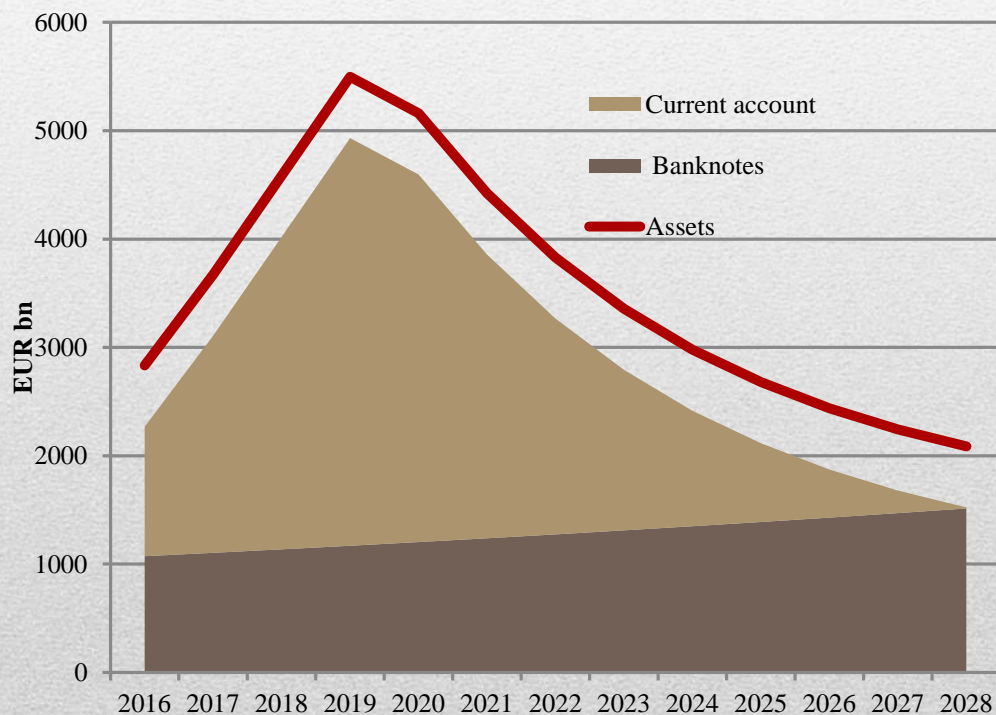
- Corridor between two absorbing facilities

And what about the future?

- Just continue like now
- Get back to old symmetric corridor
- Derivative-based interest rate control

Just continue like now

Long term balance sheet extrapolations ECB (lhs); FED (rhs)



Get back to old symmetric corridor

Liquidity control through OMOs

No ex-ante excess liquidity

Stabilizing required reserves

Narrow or broad framework? In the US? In the €-area?

Derivative-based interest rate control I

prepared with Juliusz Jablecki

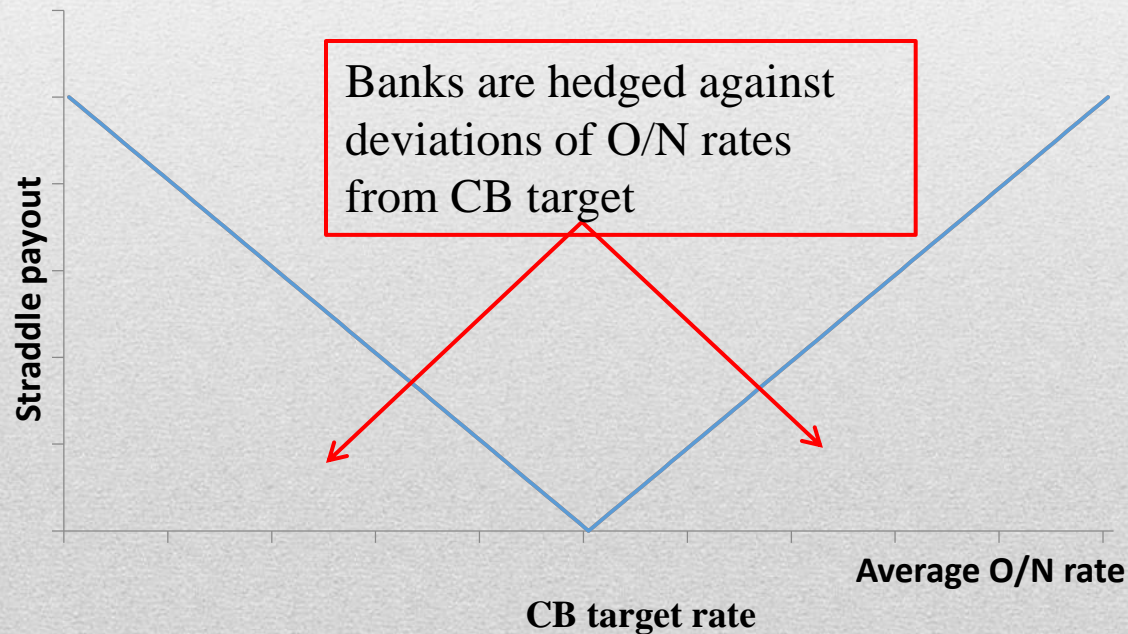
- Symmetric corridor
- Rigid demand for liquidity
- Stabilizing device needed
 - Daily OMOs
 - Draw from reserves required on average during maintenance period
 - Draw from target rate facility (Taralac)
 - **Compensate P/L effect through a straddle**

Derivative-based interest rate control II

- In a **Wicksellian approach** the central bank wants to control the interest rates, with quantities only a tool. Why not concentrating on the variable of interest rather than on the tool?
- **Liquidity:** turnover in contracts on € interest rates is twice as high as that in cash market (both secured and unsecured);
- **Price origination:** anecdotal evidence suggests pricing increasingly originates in the derivative market (e.g bond futures);
- **Lower transactions costs:** a 3M € unsecured deposit trades at ca. 15bp bid-ask spread vs. only 2-5bp on 3M OIS;
- **Lower credit risk:** collateralization and netting arrangements would allow limiting credit exposure.

Derivative-based interest rate control III

- CB offers protection against O/N volatility with a **straddle**, a combination of a payer and receiver option with a strike equal to the CB target rate
- The writing of straddle contracts complements normal liquidity provision based on a given forecast of autonomous factors
- The payout of the straddle is 0 if the O/N rate stabilizes exactly at the CB target rate and increases linearly with deviations from the strike



Derivative-based interest rate control IV

A straddle because:

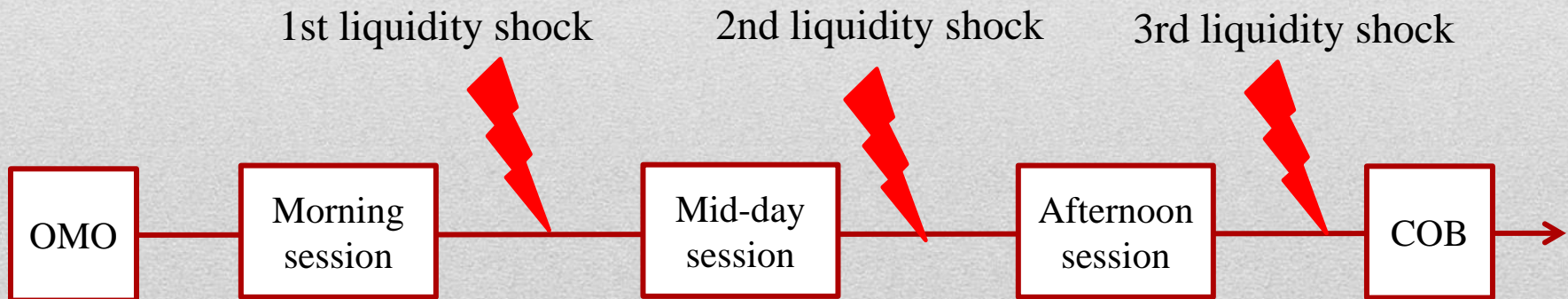
- Banks have symmetric exposure to O/N rate deviations from target if OMO covers expected shocks
- A swap would only give one sided protection
- Straddles are traded e.g. on 3M EURIBOR futures

OptContract	ExDt	U/Px	Fair/Px	ATMStrike	StrdBid	StrdAsk	StrdIV	tStrd	tStrdIV	Strd 1	StrdIV 1	Strd 1DNt	StrdIV 1DNt	CallBid	C
1) May-16	05/13/16	99.32	99.38	.0700	.0750	.0831	.0652	29.19	.0650	28.01			8.81	.0	
2) Jun-16	06/13/16	99.32	99.38	.0700	.0725	.0850	.0774	29.16	.0800	30.56			-.47	.0075	.0
3) Jul-16	07/15/16	99.23	99.25	.1400	.1300	.1500	.1334	44.96	.1400	47.15			.07	.0550	.0
4) Aug-16	08/12/16	99.23	99.25	.1600	.1500	.1700	.1537	45.06	.1600	47.03			-.10	.0650	.0
5) Sep-16	09/19/16	99.23	99.25	.1700	.1700	.1850	.1685	42.92	.1700	44.72			.53	.0750	.0
6) Oct-16	10/14/16	99.15	99.13				51.364	49.42	.2400	50.21			1.03		
7) Dec-16	12/19/16	99.15	99.13	.2700	.2600	.2800	.2598	46.55	.2700	48.54			-.20	.1450	.1
8) Mar-17	03/13/17	99.11	99.13	.3600	.3600	.3750	.3629	55.08	.3700	56.82			-1.03	.1700	.1
9) Jun-17	06/19/17	99.05	99.00	.4700	.4600	.4800	.4660	56.53	.4700	57.40			-.48	.2550	.2
10) Sep-17	09/18/17	98.99	99.00	.5700	.5600	.5850	.5687	61.49	.5700	62.40			-.48	.2750	.2
11) Dec-17	12/18/17	98.93	98.88	.6700	.6600	.6850	.6671	61.01	.6750	62.36			-.52	.3550	.3
12) Mar-18	03/19/18	98.88	98.88	.7700	.7500	.7900	.6134	64.09	.7700	65.68			-.73	.3750	.3
13) Jun-18	06/18/18	98.82	98.88	.8700	.8550	.8950	.8794	68.61	.8750	69.25			-1.44	.4000	.4
14) Sep-18	09/17/18	98.76	98.75	.9600	.9450	.9900	.9662	66.59	.9650	67.18			-.64	.4750	.5

EURIBOR future straddles are liquid and trade at narrow bid-ask spread

Derivative-based interest rate control V

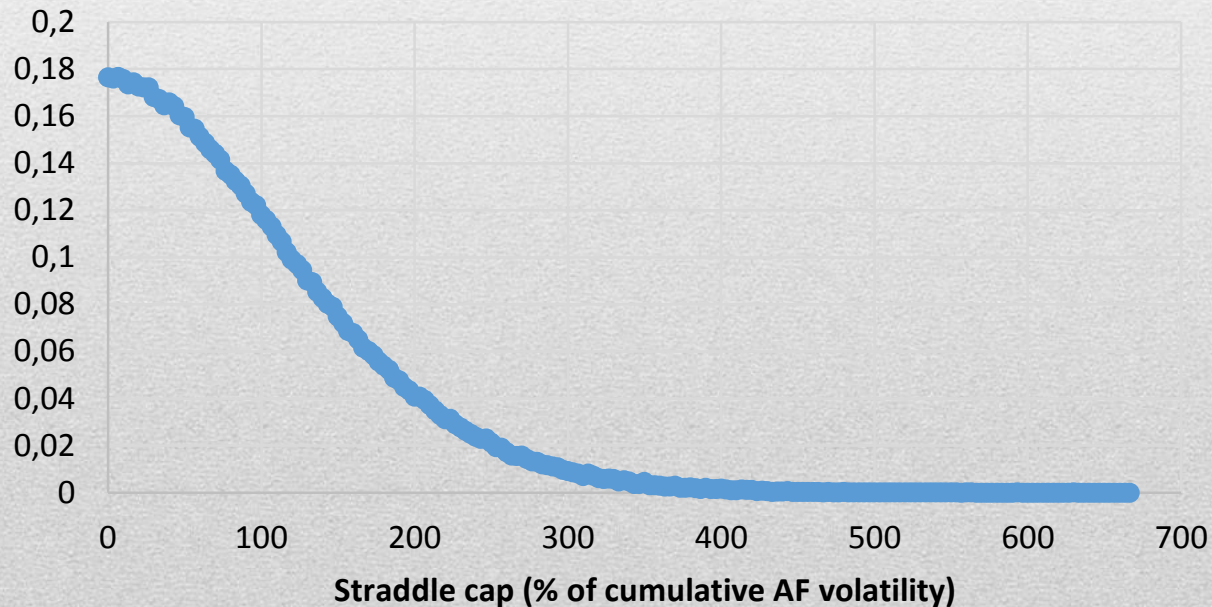
- CB balances liquidity conditions with OMO & **offers banks a straddle** with strike equal to target rate
 - Trading sessions take place and liquidity shocks materialize
 - If the banking system has a net liquidity shortfall/surplus, recourse will be taken to the borrowing/deposit standing facility
- All or part of the cost of taking recourse to either of the standing facilities can be recovered.



Derivative-based interest rate control VI

- With a **free of charge and limitless** straddle, interest rates would be pegged at target.
- A capped straddle will not eliminate interest rate volatility fully and will leave some space for interbank market functioning
- A cap calibrated to 200% of cumulative variance of daily liquidity shocks reduces O/N volatility by a factor of 4.5

O/N rate volatility



Derivative-based interest rate control VII

- Isolate from effects of LCR as interest rate control is separate from liquidity supply/demand?
- Derivatives-based monetary policy implementation vs. TARALAC facility
- How to apportion the straddle to individual banks?
- Should the straddle be offered free of charge?
- How would a straddle-based approach influence money market activity?
- What about using fixed-floating swaps?



Thank you!

...and some publicity

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[Money matters? Perspectives on Monetary Policy](#)

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