



BANK FOR INTERNATIONAL SETTLEMENTS

# Macroeconomic policies in the presence of high debt: a policy framework for the long-term interest rate?

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## SUMMARY

1. “Benign neglect” of the LT rate ended by the crisis ... but no explicit policy framework
2. LT rate as an intermediate target of monetary policy?
3. Macroeconomic link with govt debt management
4. Bond market vigilantes?
5. LT rate and financial stability
6. LT rate and EMEs
7. Exit from CB holdings of govt bonds
8. Conclusion

# 1. END OF BENIGN NEGLECT ... NO EXPLICIT POLICY FRAMEWORK FOR THE LT RATE

## Monetary policy is more than setting the policy rate

- Setting the policy rate became “conventional” monetary policy in the 1990s
- But historically a focus on the central bank’s (CB’s) balance sheet was the norm (not “unconventional”). Open market operations to
  - Influence asset markets especially govt bond markets
  - Alter volume of commercial bank reserves at the CB (“money creation”)

Post crisis, a massive and deliberate expansion of CB balance sheets (now 25% of GDP in advanced economies)

- Mandates from 1990s limited responsibility of CBs to price stability ... no longer responsible for govt debt management or for financial sector oversight

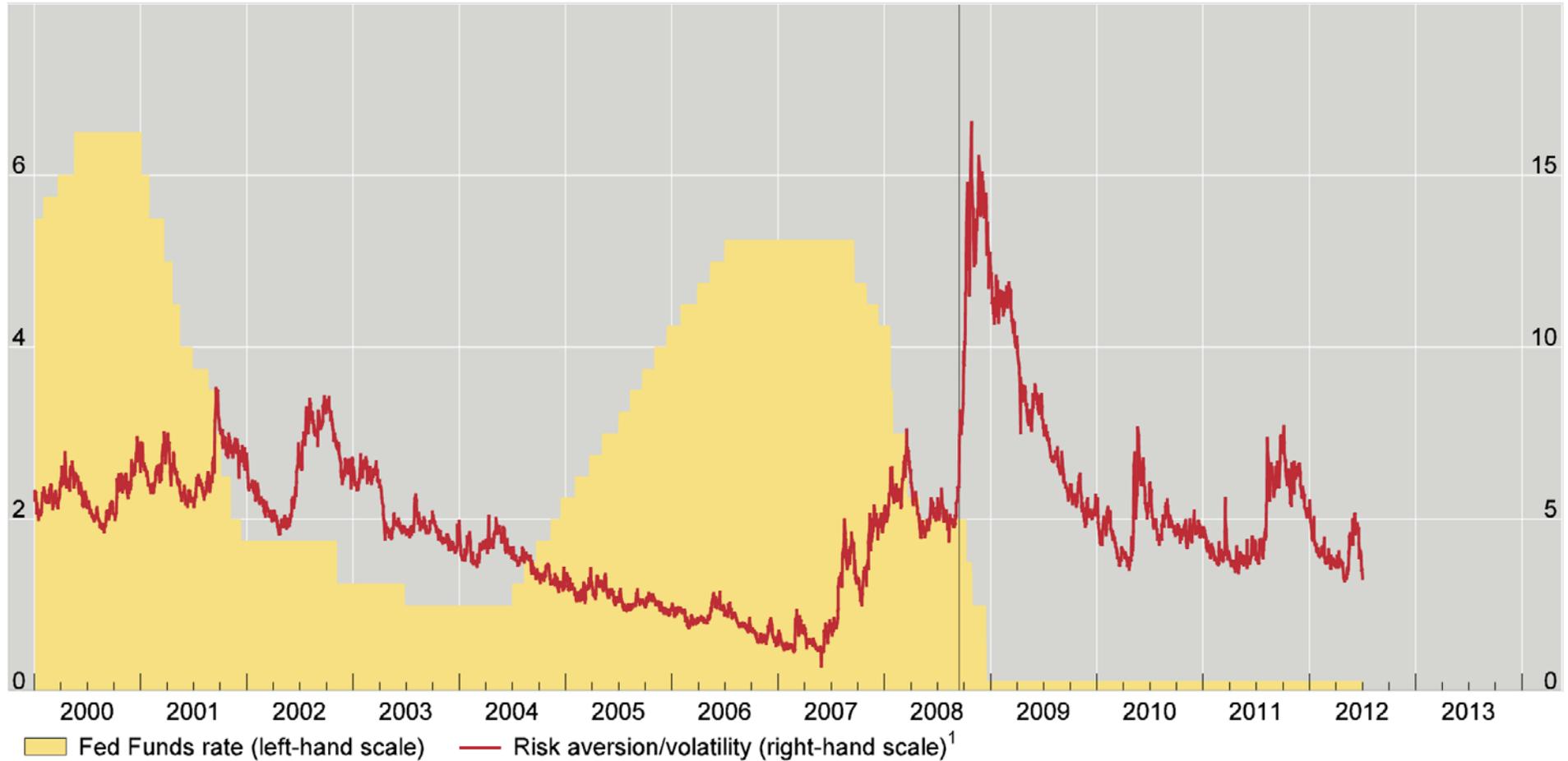
This narrowing supported by academic thinking:

- a) In New Keynesian models, open market operations irrelevant to the term premium because govt debt of different maturities highly substitutable ... and **maturity of govt debt issuance has no impact on the term premium** (Zampolli in BIS (2012))
- b) Short-term (ST) interest rate not necessarily linked with risk/volatility/leverage in financial system (Graph 1)... risk appetite greatest/market volatility most compressed from early 2006. **Raising the policy rate only gradually from mid-2004 to mid-2006 did not stop this**

Graph 1

# POLICY RATE AND RISK IN FINANCIAL MARKETS

In per cent



The vertical line marks the Lehman bankruptcy on 15 September 2008.

<sup>1</sup> Simple average of standardized scores of EMBI Global spread, US corporate high yield spread (Merrill Lynch US High Yield index), implied volatility of US equities (VIX index), implied volatility of US Treasury bonds (Merrill Lynch MOVE index) and implied volatility of G7 exchange rates (JPMorgan GVXF7 index).

Sources: Bloomberg; DataStream; national data.

## 2. LT INTEREST RATE AS AN INTERMEDIATE TARGET?

- LT rate of importance to CBs – the Federal Reserve’s triple – not dual – mandate:  
*“... to promote effectively the goals of maximum employment, stable prices and moderate long-term interest rates”*
- The recent financial crisis, and the policy responses, has put the LT rate back at centre stage
- Imperfect substitutability across maturities:
  - Uncertainty about future ST rates rises as expectations of inflation, growth etc become less well-anchored
  - Capital constraints on banks to assume maturity exposures

*As such elements vary over time, substitutability is likely to be time-variant.*  
Hence empirical analysis is difficult and policy use might be unreliable

## THREE INTERNATIONAL COMPLICATIONS (to mention)

- A CB buying assets faces a fundamental choice:
  - Buy domestic assets (largely from residents? increasing bank reserves?)
  - Buy foreign assets (largely from non-residents? depreciating currency?)
- LT rates tend to converge internationally, and so are more subject to external influences than ST rates
- Policy attitude to LT rates depends in part on whether residents (who pay taxes on interest income) or non-residents hold the bonds.

### 3. MACROECONOMIC LINK WITH GOVT DEBT MANAGEMENT

#### CB operations in govt debt markets from Keynes to Thatcher via Milton Friedman

- **Keynes** “central banks always too nervous about buying long-term paper”. Longer maturity of gilts in 1930s offset monetary policy expansion of low ST rates
- **Tobin, Milton Friedman etc.** Focus on portfolio rebalancing
- **Radcliffe Report** rejected HM Treasury view that bond sales should not influence the LT rate

*“The management of the National Debt ... [is] an instrument of single potency ... in influencing the structure of interest rates ... the monetary authorities must exercise a positive policy about interest rates, long as well as short.”*

They worried that an increase in the ST rate to restrain demand affected the LT rate only with a lag, and that a delay in increasing the LT rate could be procyclical

- **Overfunding of fiscal deficit** in UK between 1978 and 1984 ... to the tune of £75 billion a year at present day GDP

## Greenspan's conundrum: LT rate falls even as ST rates rise

1. US Treasury policies in 2001 and 2002 shortened the maturity of US Treasuries (Graph 2). This in effect added to monetary policy stimulus (probably unintentional):
  - End of 30-year bond issuance
  - New 4-week bill and end of the 12-month bill

The size of the impact of maturity choices on the LT rate requires further research

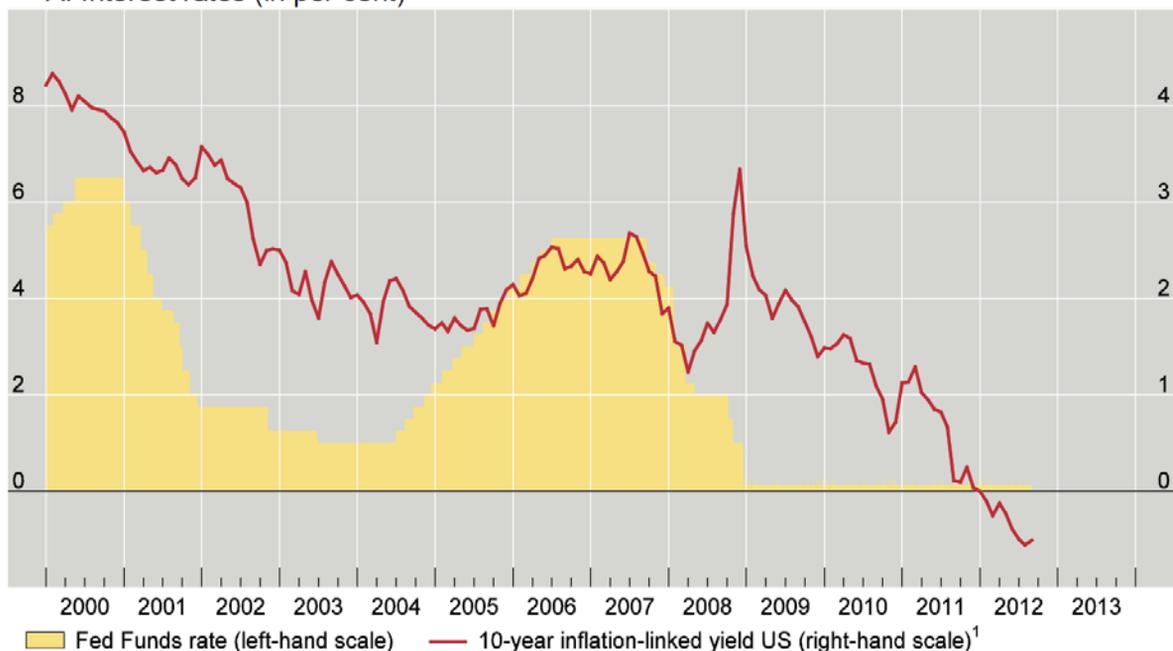
2. The Federal Reserve could have driven the LT rate up by selling bonds in 2004

Treasury debt management and central bank policies may partly explain the conundrum although other factors (eg strong foreign official buying)

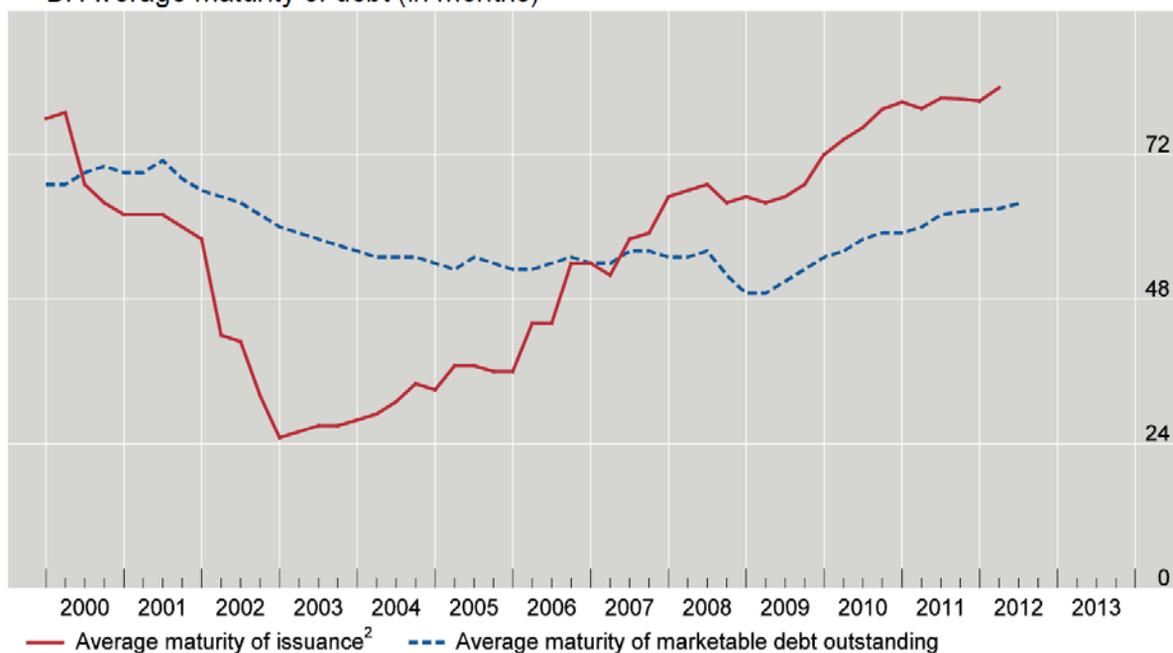
Graph 2

## THE GREENSPAN "CONUNDRUM"

A. Interest rates (in per cent)



B. Average maturity of debt (in months)



<sup>1</sup> Ten-year Treasury Inflation Indexed zero coupon yields (TIPS). <sup>2</sup> One-year moving average; shown at the end.

Sources: US Treasury; national data; BIS calculations.

## NON-CYCLICAL INFLUENCES ON THE LT RATE

It would be a mistake to attribute the decline in LT rates entirely to CB or Treasury policies.

Other forces acting:

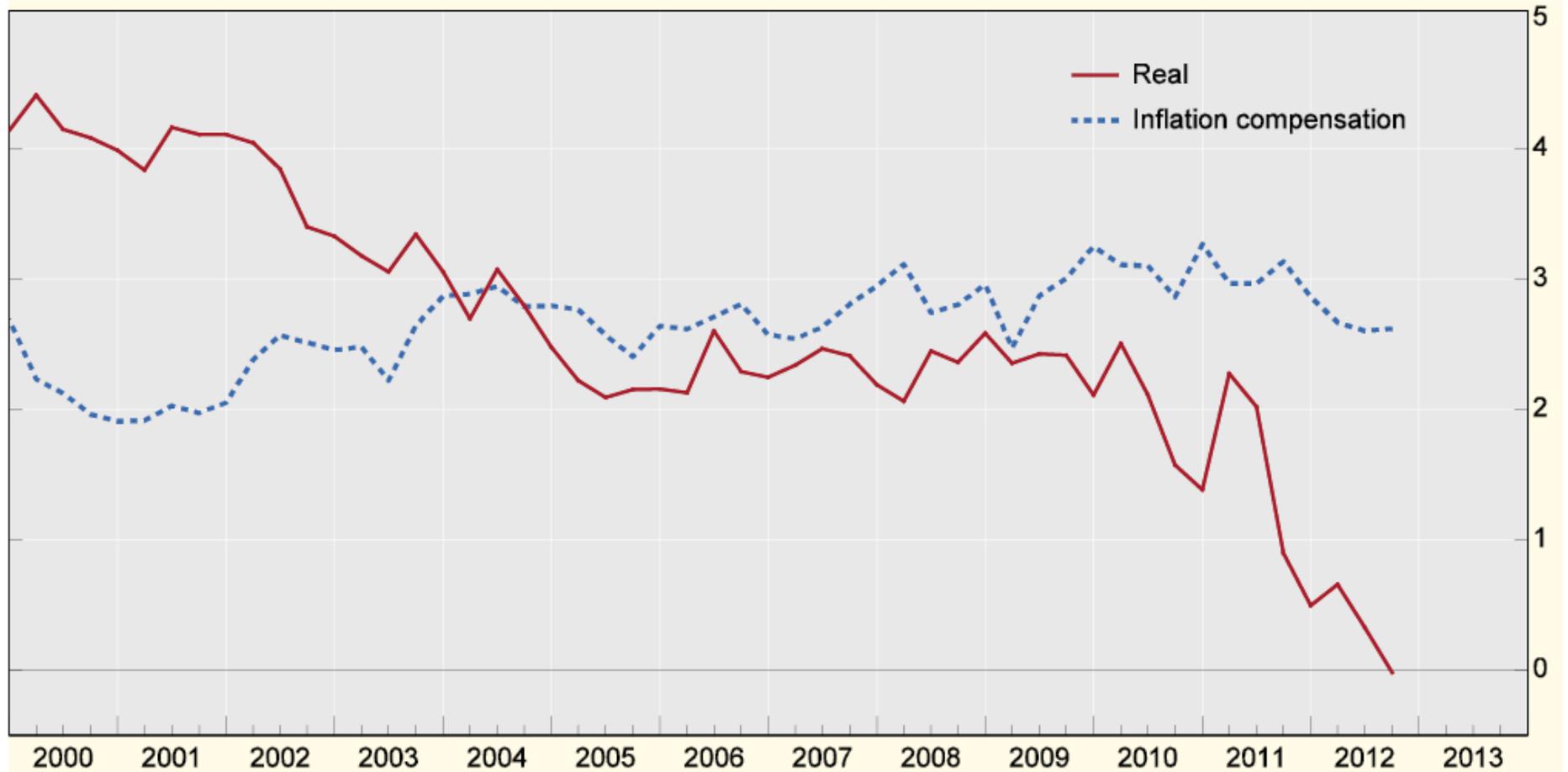
- Official investors in EMEs preference for low-risk debt paper
- New prudential regulations and mark-to-market accounting rules induce banks, insurance companies, pension funds to hold a higher proportion of their assets in govt bonds
- Increased demand for collateral in financial transactions

Sharp decline in real 5-year, 5-years forward rates, which should be free of cyclical influences (Graph 3)

Graph 3

# US 5-YEAR 5 YEARS AHEAD ZERO-COUPON REAL YIELDS AND INFLATION COMPENSATION

Quarterly averages, in per cent



Sources: National data; BIS calculations.

## 4. BOND MARKET VIGILANTES

- 1994 bond market crisis

US 10-year yield rose from 5½% to 8% (Graph 4) .... capital losses on world bond markets 10% of OECD GDP.

Fed funds rate seems to follow the rise in the 10-year yield ... although policy intent was to be “pre-emptive”

- “Measured pace” from 2004

Probably not justified on macroeconomic grounds (Taylor Rule)

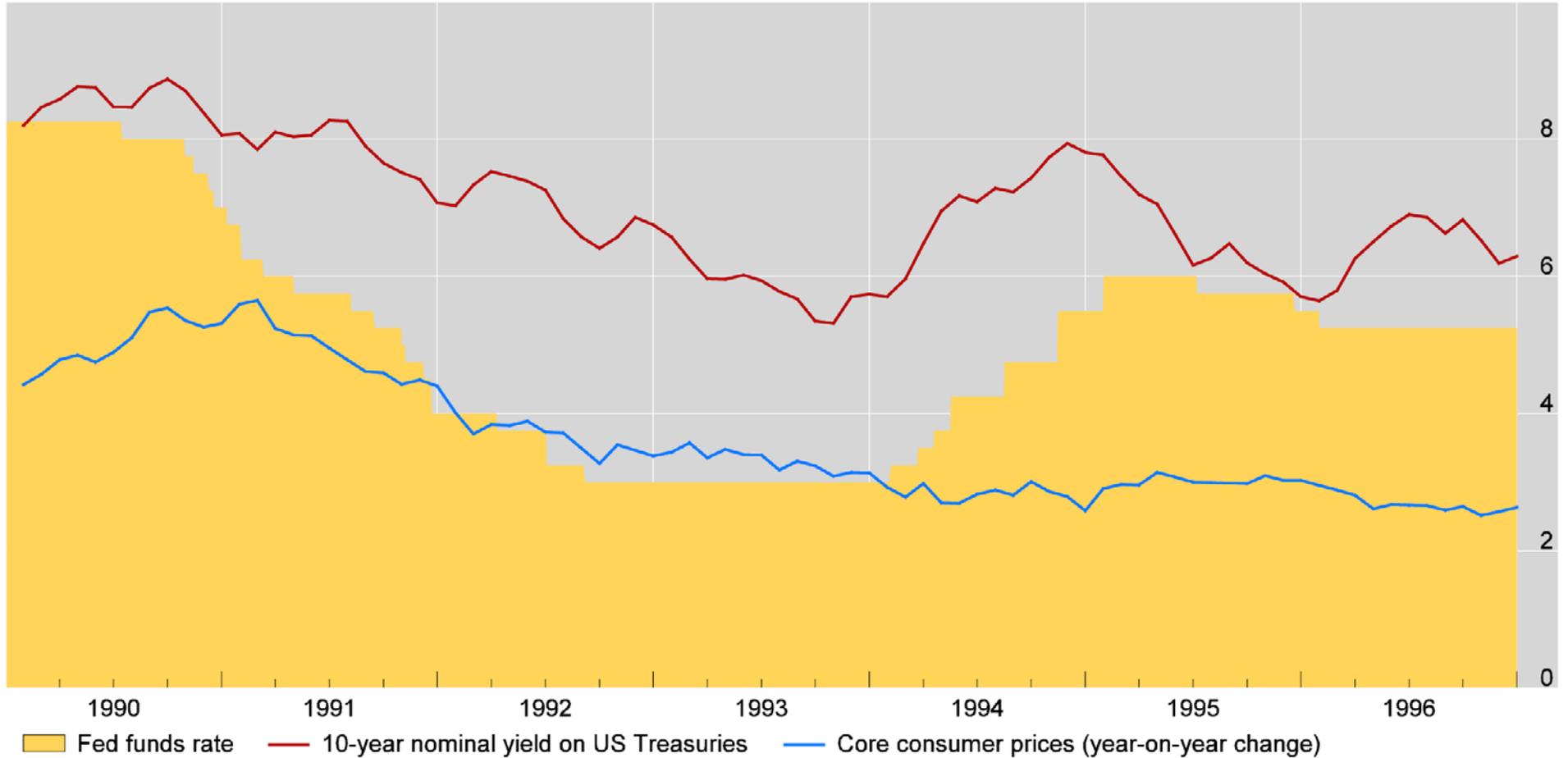
Policy intent was to “prepare” financial markets and this facilitated the maintenance of leveraged bond positions

*“... [this policy orientation] was interpreted by the market as a license for continuing to bet they could keep making money by borrowing short and investing long” (Axilrod)*

Graph 4

# US 10-YEAR NOMINAL GOVERNMENT BOND YIELD, FED FUNDS, CORE INFLATION

In per cent



Sources: Bloomberg; Federal Reserve; U.S. Bureau of Labor Statistics.

## 5. LT INTEREST RATE & FINANCIAL STABILITY

- The LT rate from govt bonds matters for financial stability:
  - Credit risk-free maturity transformation over time
  - Minimum rate for discounting future income or payments and therefore key to the pricing of all LT assets
  - Hence  $\downarrow$  LT rate  $\rightarrow$   $\uparrow$  asset prices  $\rightarrow$   $\uparrow$  value of collateral ... helping liquidity-constrained borrowers
  - Changes in the LT rate, unlike the ST rate, have immediate balance sheet implications because of capital gains or losses on bond holdings. But the endogenous responses of banks may shift this risk to their borrowers

Many conventional indicators of financial vulnerability (eg house price/rental income, credit/GDP etc) implicitly depend on the underlying LT interest rate ... and are not constant

## GOVT BONDS IN A CRISIS

Govt bonds can serve financial stability by providing the private sector with assets that are liquid and reliable in adverse circumstances

**Keynes** ... “*widows, orphans and university endowments*”. He did not, at National Debt Enquiry, advocate driving the gilt yield as low as possible

**Tirole** ... private assets cannot protect against macroeconomic shocks that affect everybody simultaneously

ST govt bills protect holders from capital losses when interest rates rise and LT bonds lock in income flows ...

This function of govt bonds is of second-order importance  
in normal periods but vital in a crisis

## A MACROPRUDENTIAL QUESTION ON THE LT RATE

- Efforts to make wholesale financial markets safer have increased the demand for govt bonds as collateral
- New prudential regulations, mark-to-market accounting rules, more rigorous actuarial conventions etc are inducing financial institutions to hold more bonds

Each reform considered by itself should make individual firms or markets safer

But what is the aggregate impact of all such reforms on the financial system?

The total potential impact of a fall in bond prices has increased with the stock of govt bonds held outside the Federal Reserve (private sector, foreign official holders etc)

<b>US Treasury debt maturity &gt;1-year</b>	<b>Amount held by public (trillions of dollars)</b>	<b>Market yield (% , weighted avg)</b>
31 Jan 2007	2.4	4.92
30 Jun 2012	6.0	0.92

## A MACROPRUDENTIAL QUESTION ON THE LT RATE

Key questions include:

- Where would the risks accumulated during a prolonged period of low LT rates reside? Do holders mark their bond portfolios to market?  
  
Have banks shifted the maturity risks to households or firms? Banks may shorten the maturity of their lending to the private sector as they hold more long-term bonds (European banks have cut longer-term international lending)
- How leveraged are the interest rate exposures of financial intermediaries?
- How diversified are the portfolios of financial firms holding bonds (eg by holdings of equities)?
- Have portfolio allocation decisions become more procyclical?

When nominal interest rates are unsustainably low, indicators such as debt service/income ratios give a false sense of security

Is the LT rate mean-reverting over a time horizon relevant for policy? Doubtful

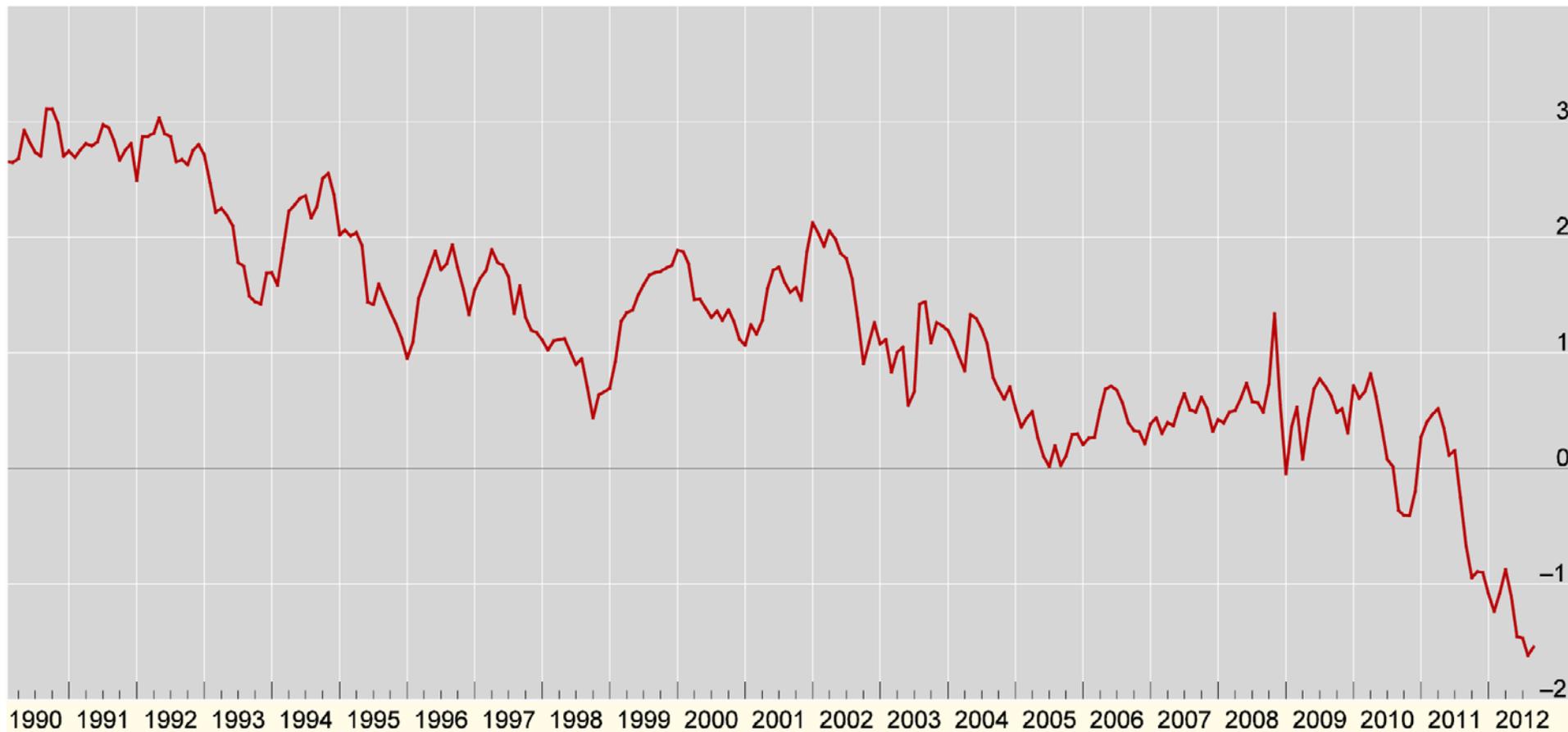
## EXCEPTIONALLY LOW LONG-TERM RATES

<b>Inflation-linked 10-year bonds</b>	<b>US Treasuries %</b>	<b>Gilts %</b>
1990–1999	4.23	3.48
2000–2009	2.46	1.84
2010	1.23	0.65
2011	0.60	0.24
2012	−0.33	−0.64

The term premium is now a negative 150 bp (Graph 5)

Graph 5  
**THE TERM PREMIUM IN US 10-YEAR NOMINAL GOVERNMENT BOND YIELDS<sup>1</sup>**

In per cent



<sup>1</sup> Sum of inflation and real yield risk premia. These are calculated using the BIS's standard yield curve models.

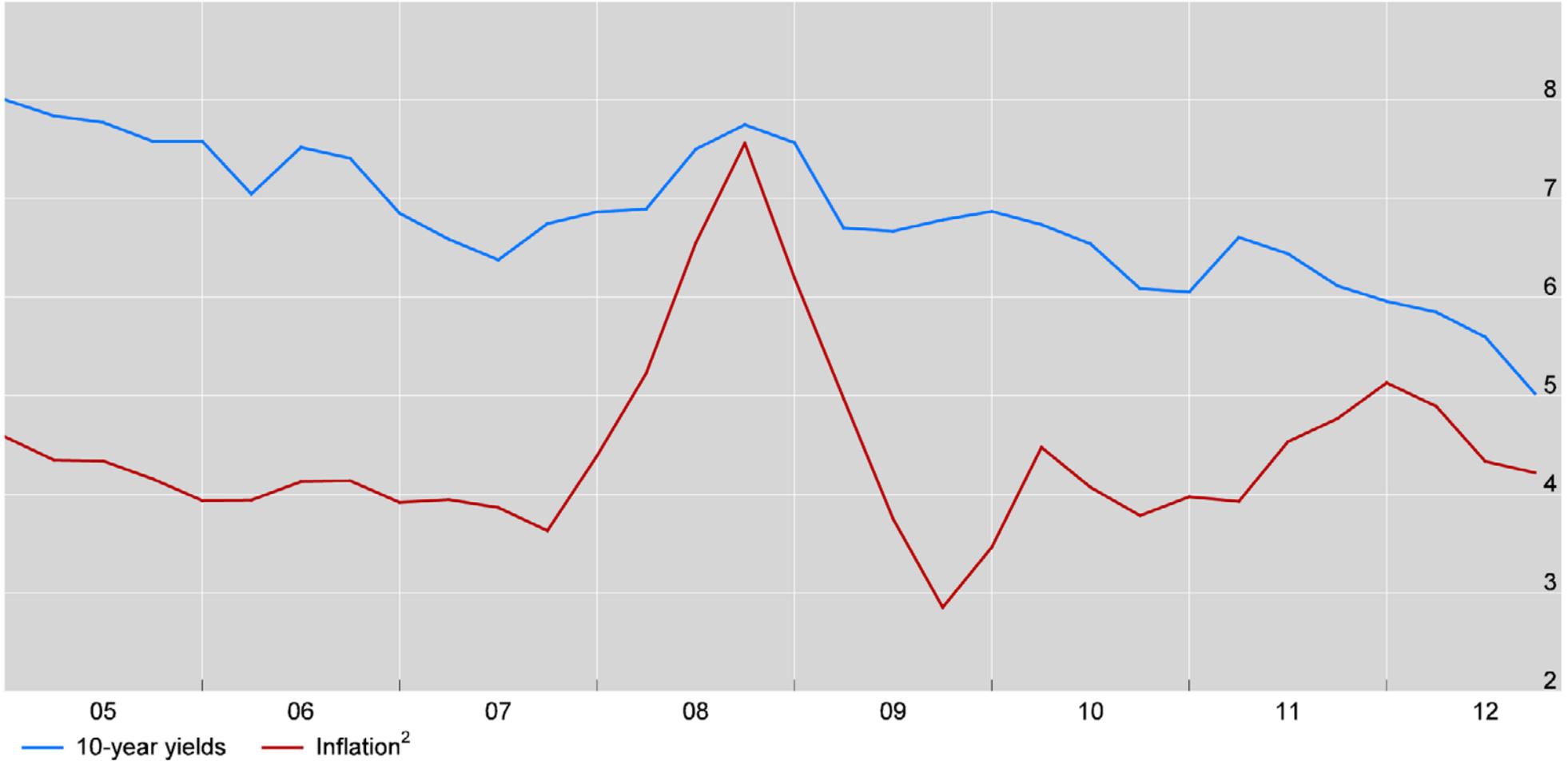
Sources: Bloomberg; national data; BIS calculations.

## 6. LT RATE AND EMEs

- Average real yields decline from 4% in 2005 to 1% in 2012 (Graph 7)
- Sensitivity of yields on EME bonds to changes in 10-year US Treasuries now greater than their sensitivity to changes in the yield on domestic 3-month paper

# Graph 7 10-YEAR BOND YIELDS AND INFLATION IN EMERGING MARKETS<sup>1</sup>

In per cent



<sup>1</sup> Simple average of Brazil, Korea, Mexico, Malaysia, Poland, South Africa, Thailand and Turkey. <sup>2</sup> Year-on-year change.

Sources: Bloomberg; DataStream; national data.

## 7. EXIT FROM CB HOLDINGS OF GOVT BONDS

From September 2009, CBs hoped to “exit” and return their balance sheets to normal. But deepening € crisis dashed such hopes: balance sheets grew and the maturity of their assets lengthened

As CB assets have risen, so have their liabilities. CB purchases from residents increase commercial bank deposits. In a crisis, deposits with the central bank increase.

Such reserves now at unprecedented levels ... in the United States, reserves now exceed 17% of total bank deposits (Graph 8)

- What will be the impact of very liquid balance sheets on the future behaviour of banks?  
No consensus
- Managing such a large liquidity overhang could be difficult. Technically, CBs have the tools to raise interest rates and drain liquidity. But success with marginal and gradual adjustments in a normal cycle not a good guide to exiting more extreme conditions:
  - More difficult to calibrate technically
  - Constraints related to interest rate exposure of banks
  - Political pressures

**Monetary policy choices may become constrained:**

UK's experience of 1950s, 1960s (Allen in BIS (2011));

EME experiences with the consequences of massive foreign exchange intervention for the domestic banking system (Filardo and Yetman (2012))

Graph 8

# BANK RESERVE BALANCES WITH THE FEDERAL RESERVE

As a % of total bank deposits<sup>1</sup>



<sup>1</sup> Reserve balances of depository institutions with Federal Reserve banks as a percentage of total deposits of commercial banks in the United States.

Sources: Federal Reserve, BIS calculations.

## CB SALES OF GOVT BONDS

CB holdings of LT assets will not automatically run off quickly – which is why CBs were very reluctant to buy LT assets

CB sales of govt bonds as a policy tool to raise the LT rate must reckon with two, very sensitive effects:

- Increase govt financing costs ... what would the govt debt manager say?
- Impose losses on balance sheets of financial institutions with long bond positions ... would this create financial stability constraints on interest rate policy?

The exit strategy will involve many complex choices (Chart 1):

- a) Automatic or rules-based?
- b) Rule based on quantities or on prices?
- c) CB or DMO decide? Side constraints?

Has the line between monetary and fiscal policy become more blurred? (Iwata, 2012).

As the BoE and FRB currently hold more than 30% of marketable govt debt with maturities of 5 years or more, the implications of these choices could be huge

Chart 1

**CB HOLDINGS OF GOVERNMENT BONDS: THE EXIT POLICY**

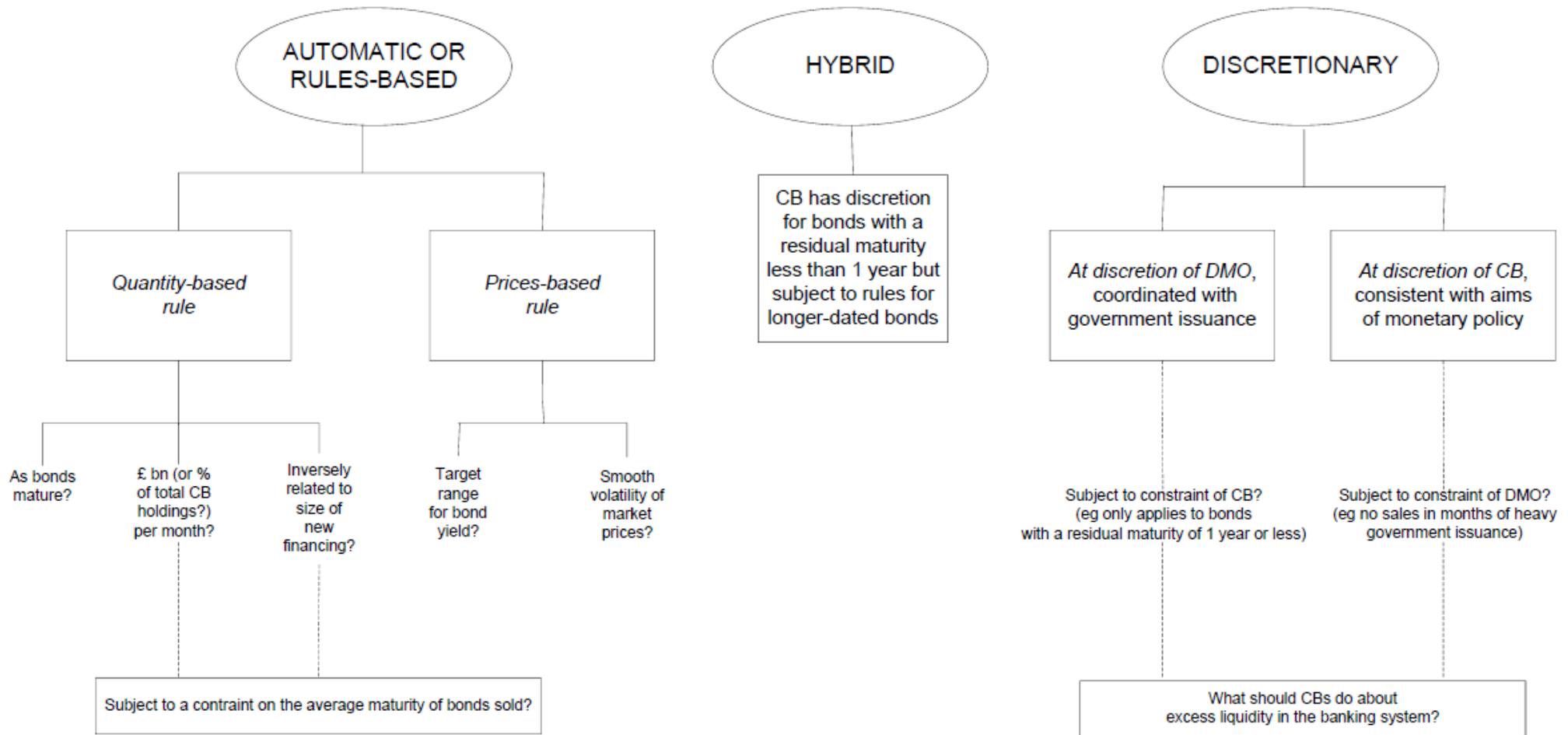


Chart 1a

**CB HOLDINGS OF GOVERNMENT BONDS: THE EXIT POLICY**

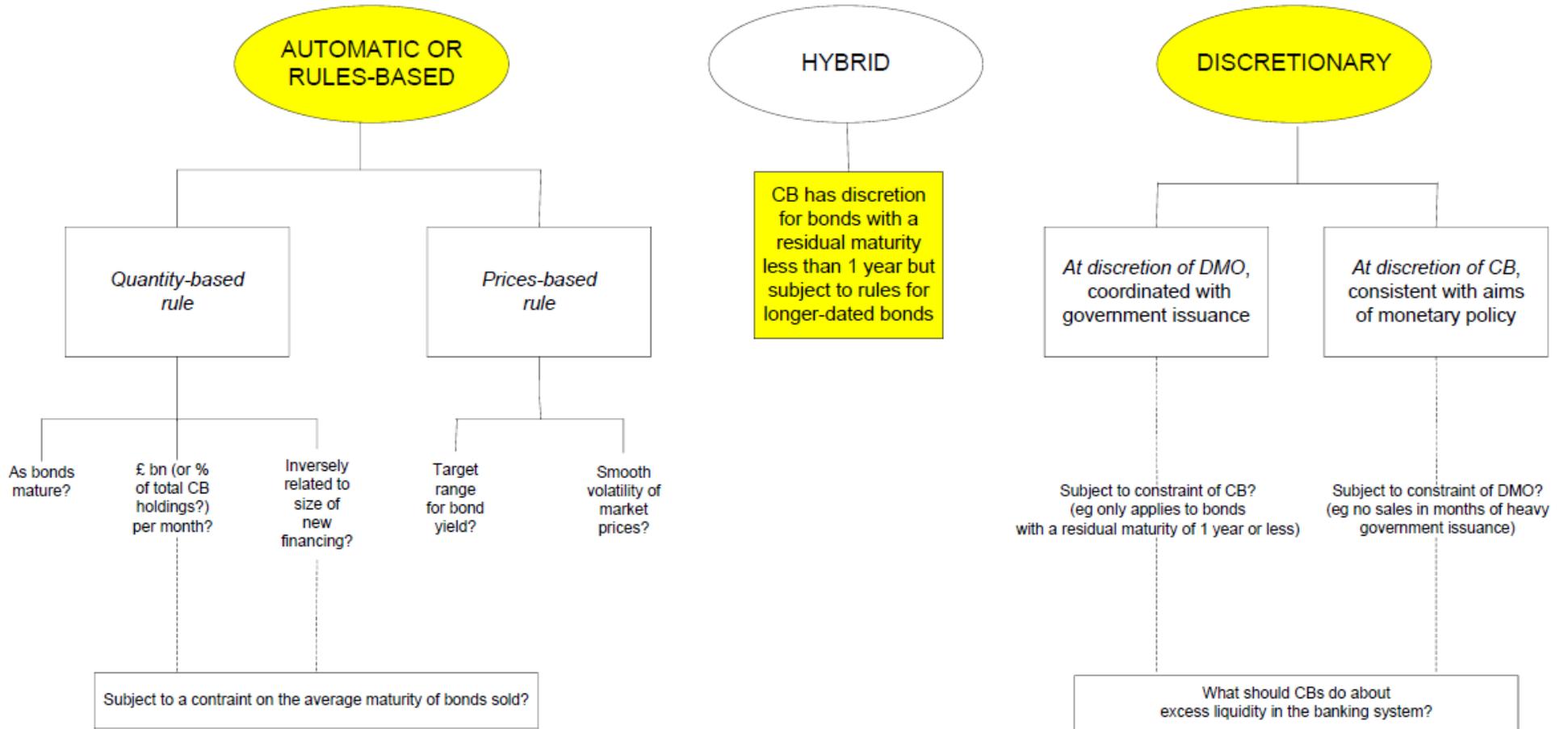


Chart 1b

**CB HOLDINGS OF GOVERNMENT BONDS: THE EXIT POLICY**

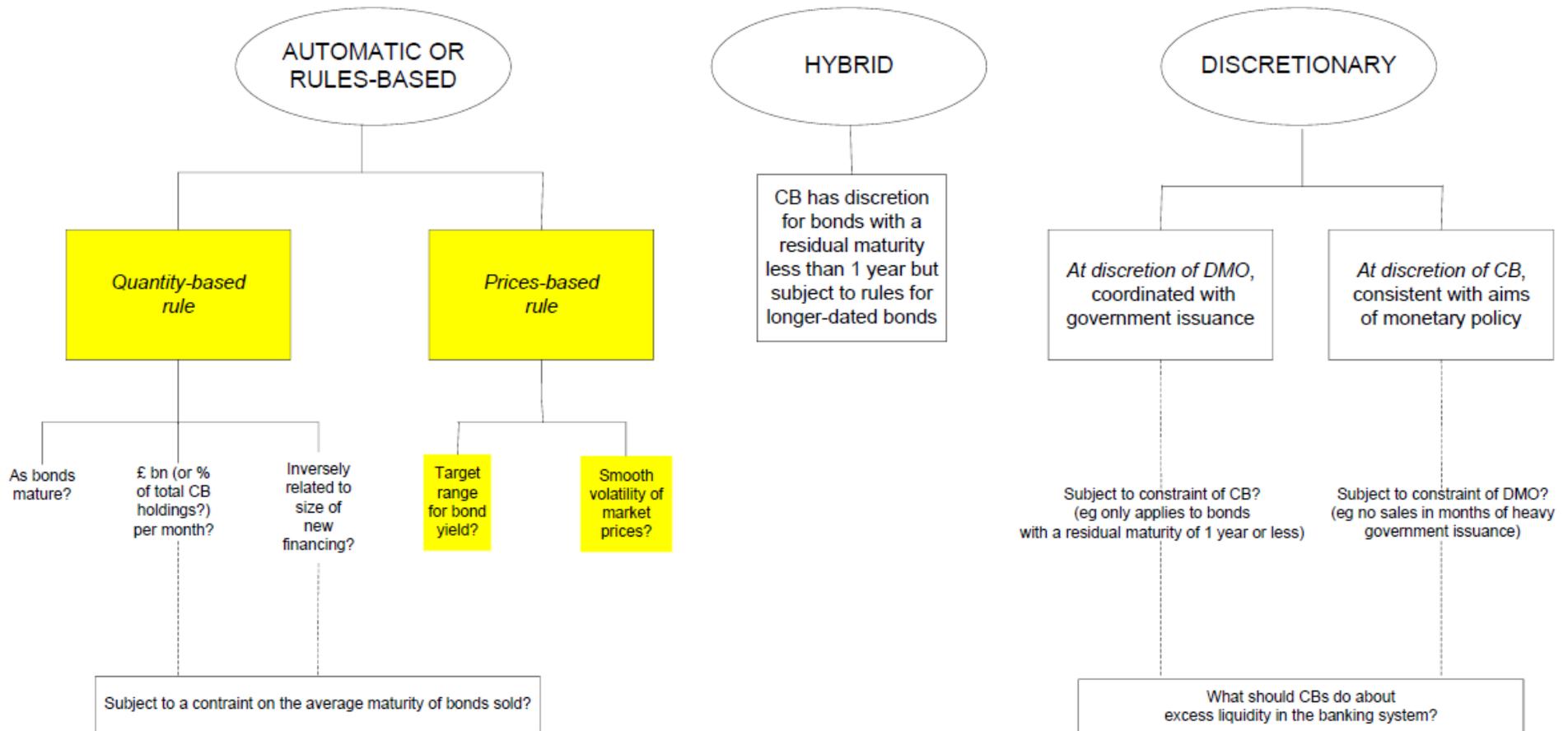
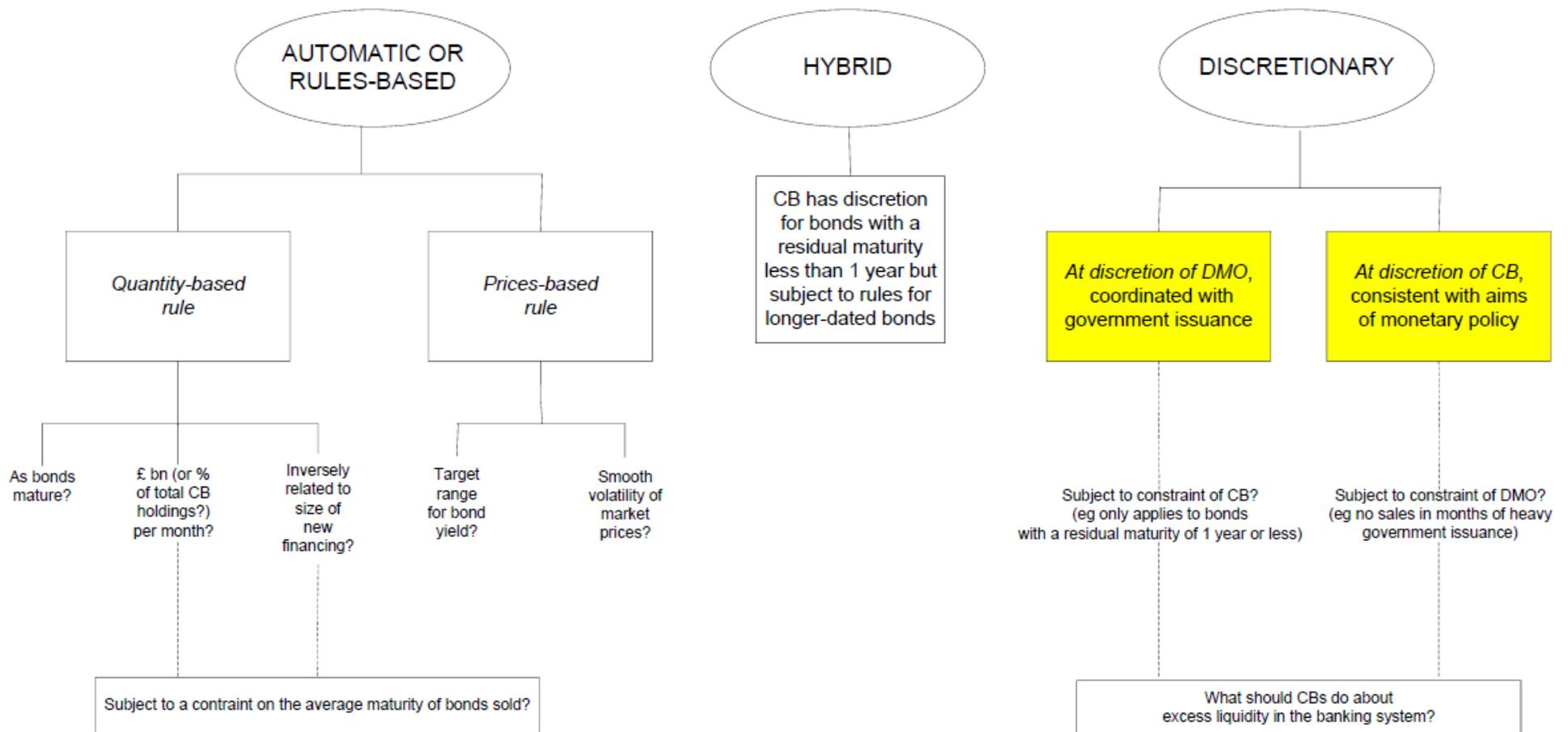


Chart 1c

**CB HOLDINGS OF GOVERNMENT BONDS: THE EXIT POLICY**



## SIGNALS FROM CENTRAL BANKS

- “Without the ability to reverse its policy [by] selling gilts and withdrawing money from the economy, the central bank would run the risk of losing control over monetary conditions” (Governor of the BoE)
- Central bank sales could send markets a disproportionate signal
- Game theory: central banks are non-commercial players that can print money and have “structural patience” to outlast market participants (El-Erian, 2012)

## GOVT DEBT, FISCAL POLICY & VOLATILITY OF INTEREST RATES

- At what point does high and rising public debt increase interest rate uncertainty?
  - Not easy-to-manage stochastic risk but rather Knightian uncertainty?
  - Bimodal probability distributions related to uncertainty about policy frameworks
- Macroeconomic models ... govts cutting large budget deficits create big swings in the natural rate of interest (Canzoneri et al in BIS (2012))
- Leverage in the financial system can magnify the impact of a macroeconomic shock

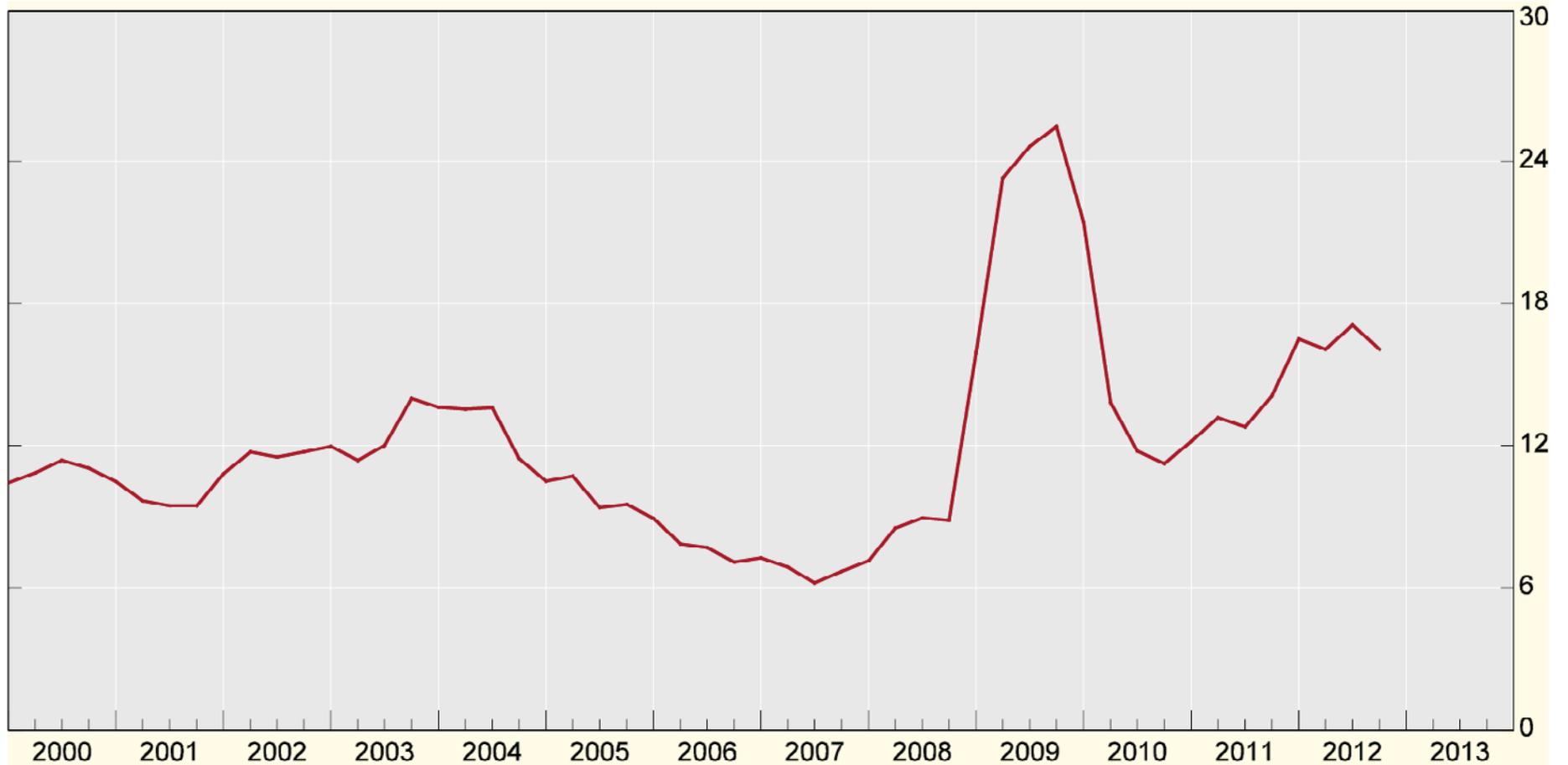
At present, the term premium is negative ... even a return to historically moderate risk premia would push up yields

It does not require either an inflation shock or a real yield shock

Markets edgy about future interest rates (Graph 9)

Graph 9  
**VOLATILITY OF FORWARD US LONG-TERM YIELDS<sup>1</sup>**

In basis points



<sup>1</sup> Standard deviation over preceding 52 weeks of changes in weekly averages for 5 year 5 years ahead zero coupon yields; calculated from 10 year and 5 year zero coupon government bond yields.

Sources: National data; BIS calculations.

## 8. CONCLUSION

Exceptional policies - doubtless justified by the severity of the crisis – have pushed both CB balance sheets and the financial system to uncharted territory:

- The CB and the financial industry holding huge stocks of govt bonds, at very low yields
- Explosion in commercial bank reserves at the CB

This is compounded by high and growing public debt. All this will put great strain on earlier macroeconomic policy frameworks

What is the private sector to expect? Multiple equilibria?

Could these extreme positions make the usual exit policies harder to implement?

Would a crisis force the authorities into sub-optimal choices?

## HOW WOULD THE AUTHORITIES REACT TO A SUDDEN DROP IN BOND PRICES?

Easy to rationalise interventionist policies on the LT rate. Consider three dimensions of policy:

1. **Monetary policy** ... when expectations become less well-anchored, ST and LT become less good substitutes. Hence the transmission from short rates to long rates is impaired – giving a good monetary policy reason for increased OMOs? But excess liquidity in the banking system could be a constraint
2. **Financial stability** ... when markets disturbed, liquidity declines and price discovery impaired. Self-fulfilling panics: bond holders could be forced to sell in a falling market. Hence good financial stability reasons to intervene?
3. **Govt debt management** ... shorten issuance to accommodate public's preference ST paper (liquidity preference)? Or keep long as a precaution in case the crisis worsens?

... but interventionism always dangerous for a market economy. Markets have their own resilience

Do govts and CBs have policy frameworks that carry the conviction with markets needed to withstand such a crisis?

Does the “beguiling simplicity and neat separation of decision-making [in current monetary policy frameworks] need to give way to a policy framework and structure of institutions that promotes coordination of the various policy instruments in the pursuit of interlocking objectives”?

(Gieve, 2012)

## Benign neglect of the LT interest rate is over

But a policy framework incorporating the LT rate faces several difficulties:

- Determining “optimal” level of LT rate, which changes over time
- Impact of CB sales/purchases of bonds (or Treasury debt issuance choices) on the LT rate
- Impact of a lower term spread on banks’ lending policies
- Impact of changes in the policy rate on the LT rate

... so easy to understand the appeal of benign neglect

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