

The Actuarial Profession
making financial sense of the future

Highlights of the Life Conference 2010
Paul Fulcher, Emily Penn & Ross Evans

Hot Topic Yield curve dynamics

17 February 2011 and 8 March 2011

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The yield curve see-saw

"The markets can stay irrational a lot longer than you and I can remain solvent"

Supply & Demand

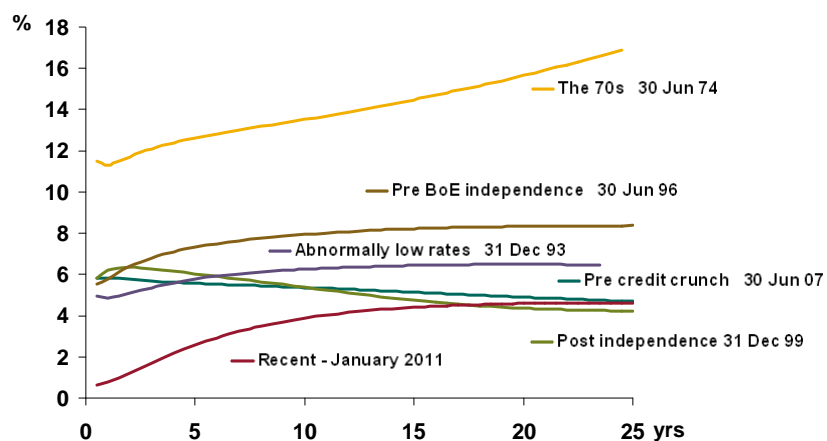
Macroeconomics



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“The future ain’t what it used to be”



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Source: Bank of England

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Decomposing yields

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Back to the classroom – Government bonds

$$\text{Return Above Risk-free} = \text{Term Premium} + \text{Liquidity Premium} + \text{Credit Risk Premium}$$

 Inverted at long end

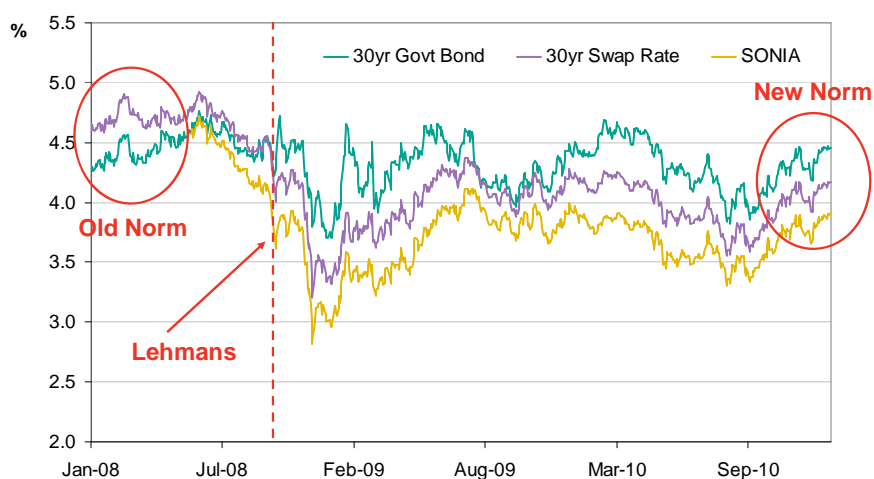
 Negative for many sovereigns

 Major issue in 2010

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“Risk-free rate” – Pretenders to the throne

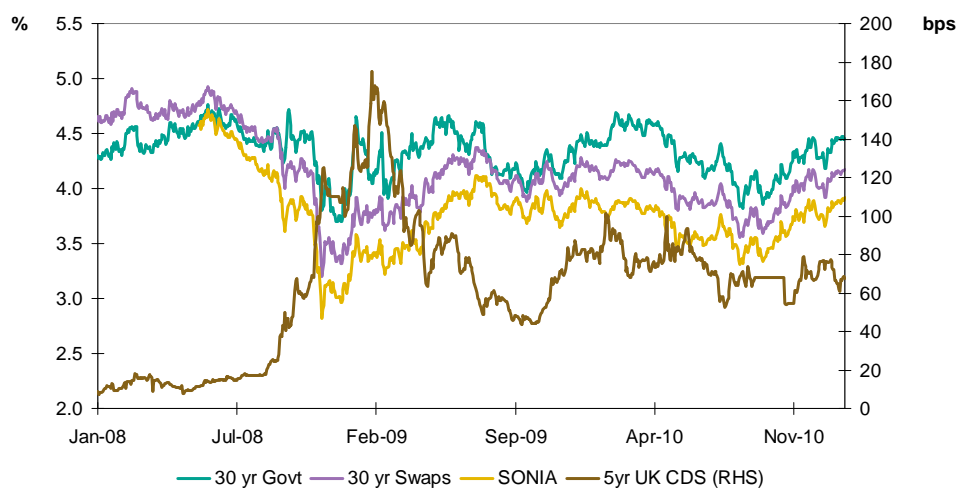


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Source: RBS

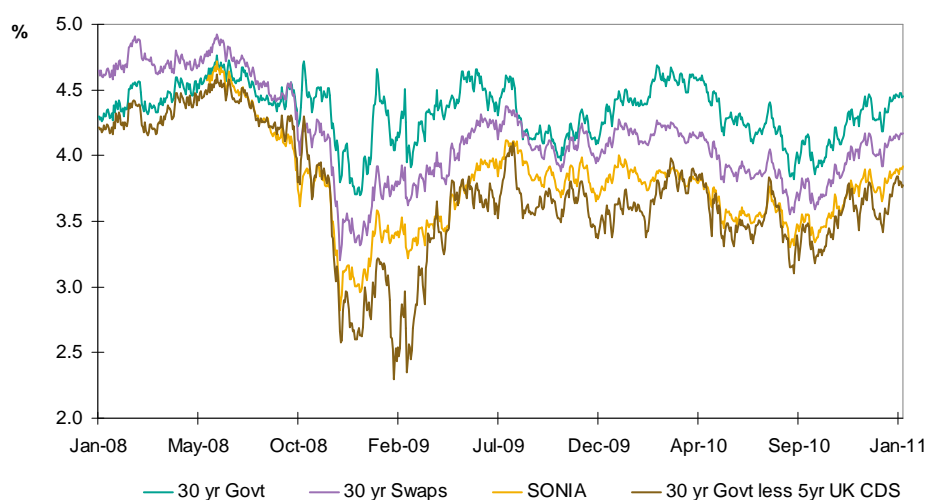
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Credit default protection on the UK government



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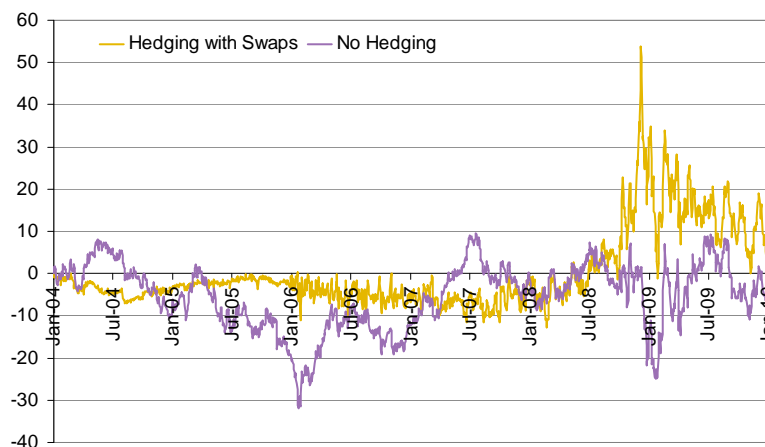
A fourth contender?



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Gilts vs. Swaps

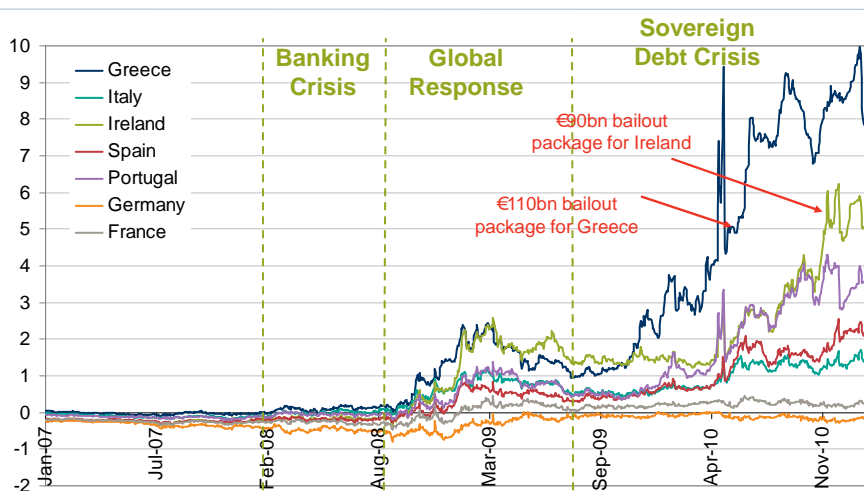
Movement in net assets for a 30yr liability valued at Gilts



Source: SIAS paper "Does your hedge do what it says on the tin"

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EU sovereign debt concerns



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Quantitative Easing (“QE”)

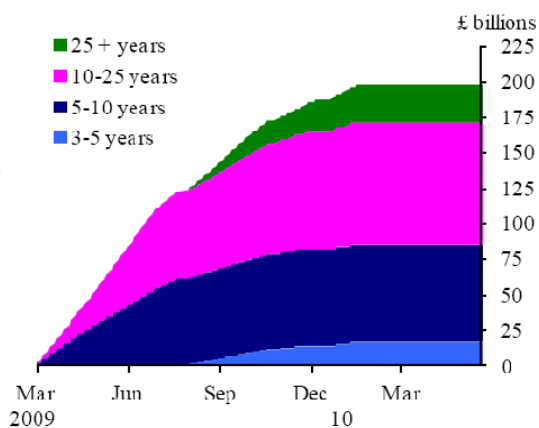
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What is it?

Cumulative gilt purchases by maturity

- Response to global financial crisis
- Programme of large scale buy-backs of gilts
- Aim of injecting money into the economy



Source: Bank of England

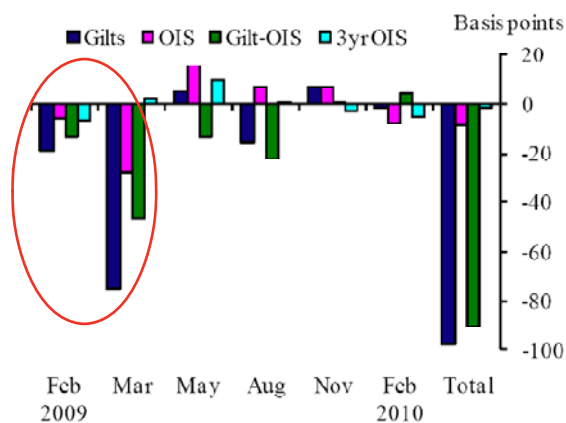
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Buy the rumour ...

QE impact on gilt yields, OIS and gilt-OIS spreads

"Summing over the reactions in gilt yields to each of the QE news events gives an overall average fall of just under 100 bps"



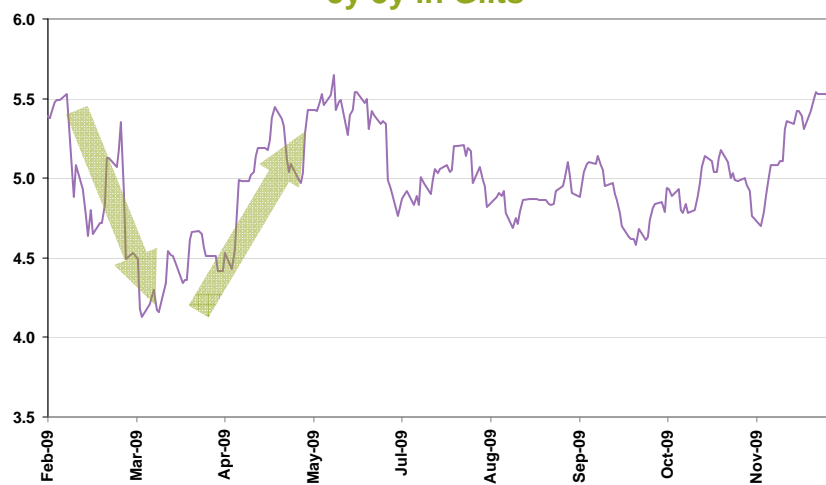
Sources: Bloomberg and Bank calculations.

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Sell the fact ...

5y 5y in Gilts



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Source: RBS

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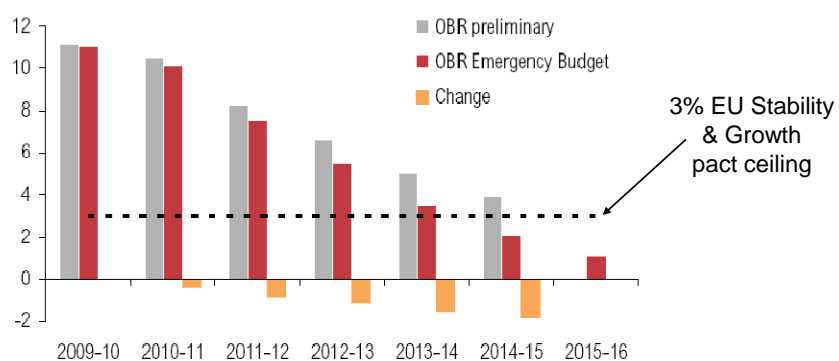
Short and mid curve dynamics

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Where we are.....huge budget deficits

Public Sector Net Borrowing (PSNB)
Emergency Budget v OBR prelim. f/c, 2010-11 to 2014-15, % of GDP



Source: OBR/HMT

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Monetary stimulus

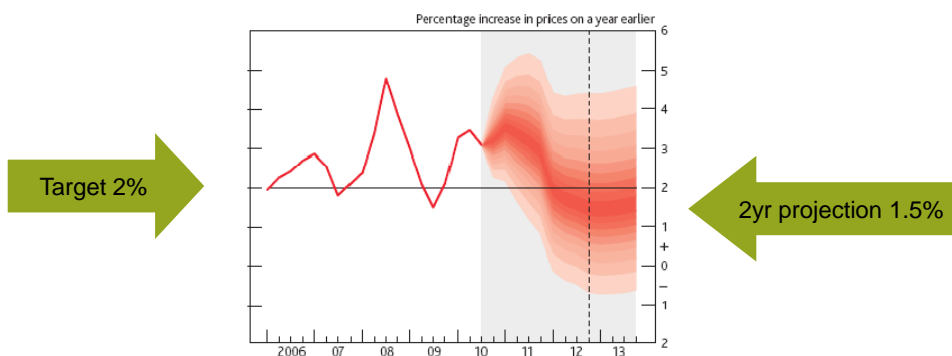


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Inflation uncertainty....

CPI inflation projection



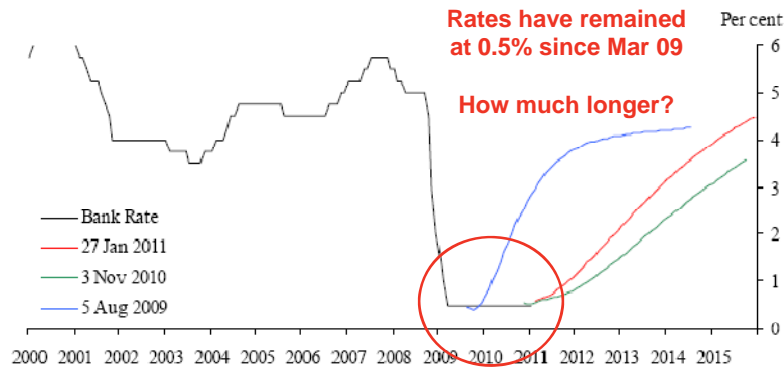
Source: BoE Inflation Report – August 2010

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UK rates lower for how much longer

UK base rate



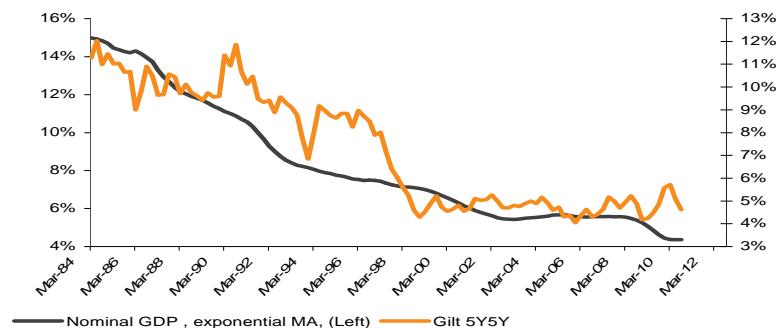
Source: Bank of England

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Gilts 5Y5Y – Gilts still cheap

- Secular trend towards lower and flatter curves is driven by lower nominal GDP trends

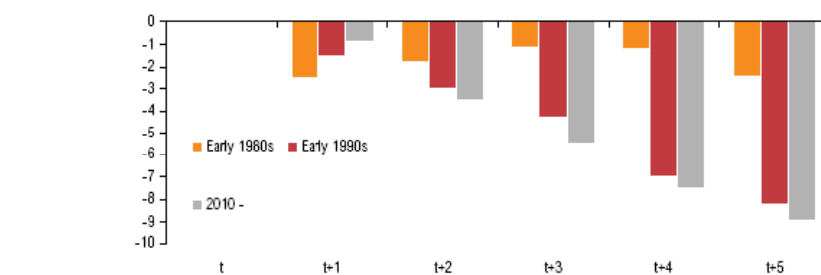


Source: RBS

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Have we been here before?

Reductions in PSNB, % of GDP



t = start of recession

Source: HMT, RBS

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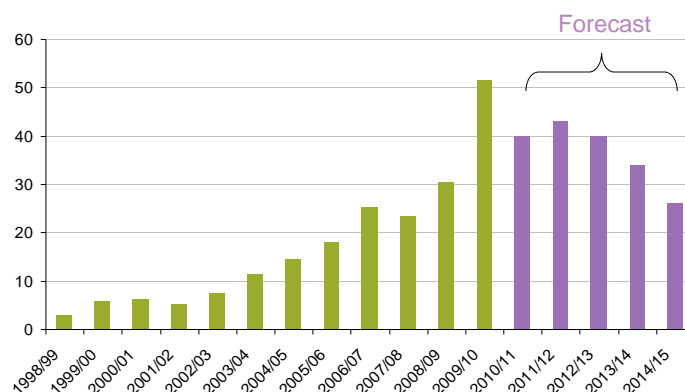
Long end of the curve

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Gilt supply

15Y+ Gilt issuance

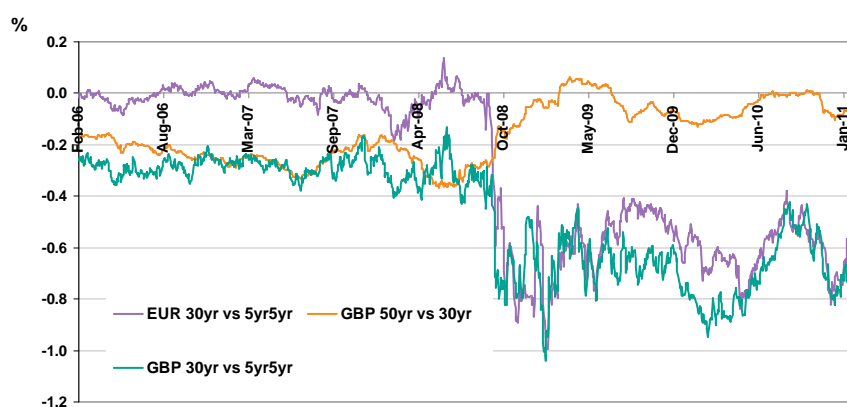


Source: DMO, RBS

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Rates at the long end

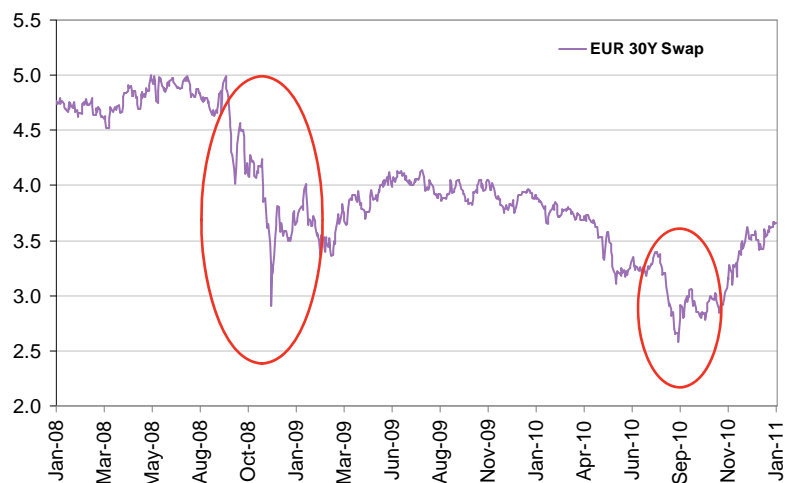


Source: RBS

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Eurozone – ALM and long end rates



Source: RBS

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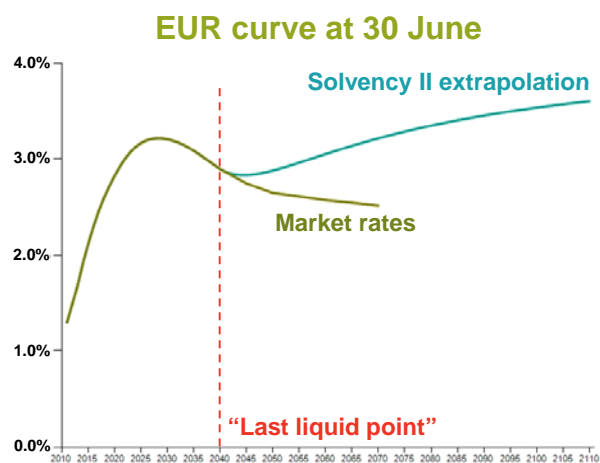
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Extrapolation methods

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Solvency II extrapolation

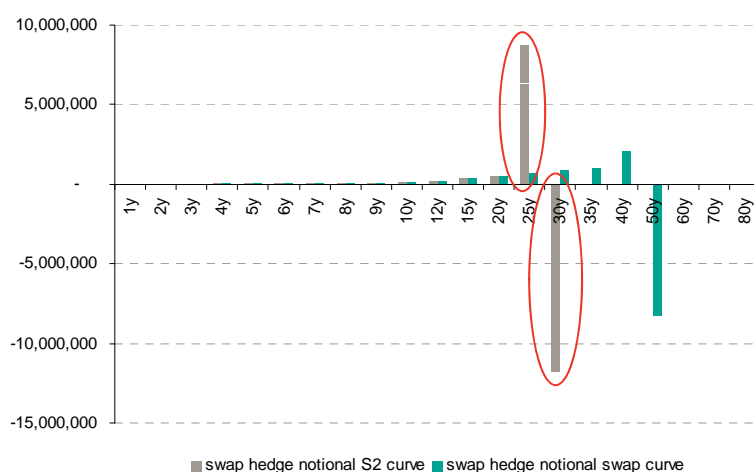


Source: CEIOPS, RBS

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Hedging implications



Source: RBS

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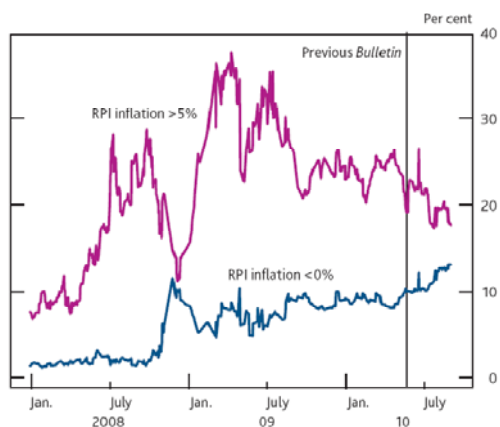
Market consistency vs. Real world

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Market consistent PDF – Inflation

Weight on high and low UK RPI outturns



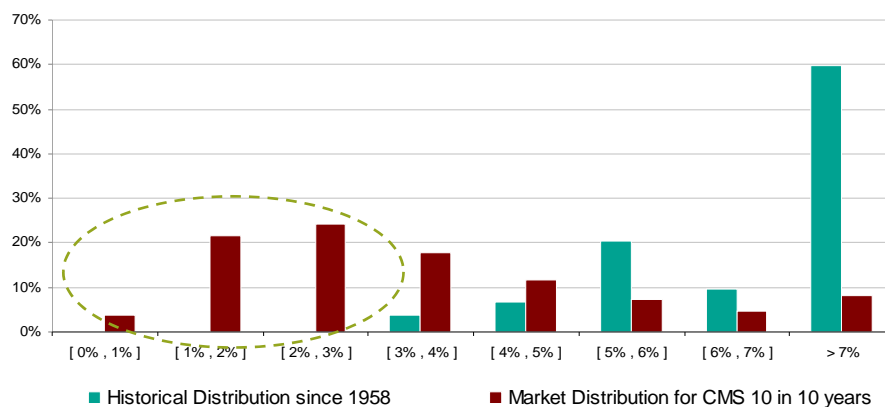
Sources: Bloomberg, Royal Bank of Scotland and Bank calculations.

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Historical vs. market probabilities for long rates

Probabilities implied by the market: Euro CMS 10 in 10 yrs time

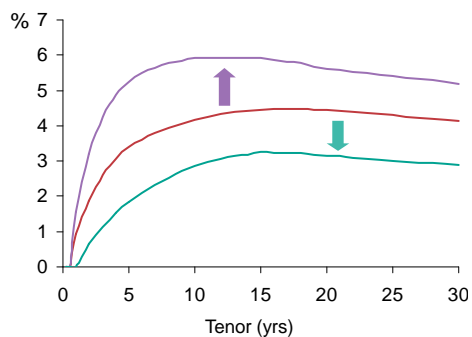


Source: Bloomberg, RBS

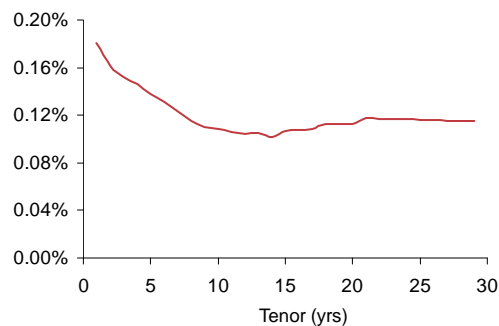
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Active management of rates under Solvency II

Interest Rate Shock to QIS5 GBP Yield Curve (31 Dec 2009)



Required Bias in 1yr Forwards (31 Dec 2009)



Source: CEIOPS, RBS

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Questions or comments?



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