

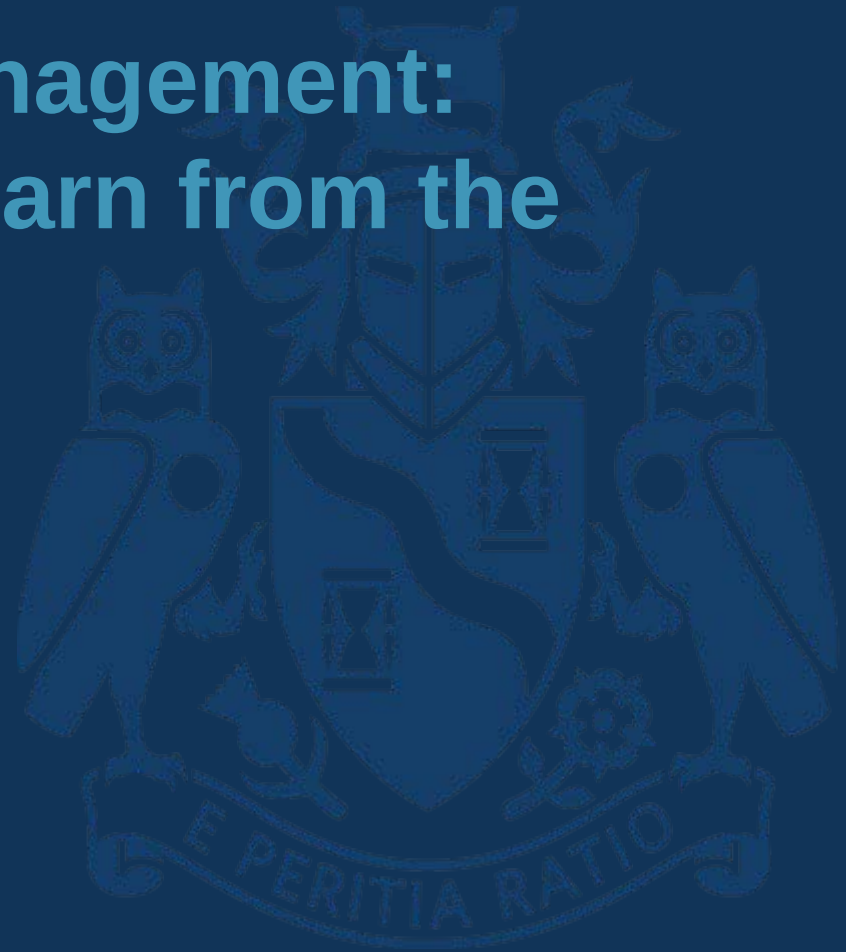


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Interest rate risk management: What insurers can learn from the active LDI managers

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What is 'LDI'?

- Liability driven investment
- Not a product
- Framework to link a funds asset's to its liabilities



- Manage exposure to interest rates and inflation

Why did LDI come about?

- Stock market crash of early 2000s
- Highlighted faith placed in equities



“Regulation”

- Pensions regulator 2005
- IAS19 – Funding position on corporate
- Myners report

.....Sound familiar?

The development of LDI

Early 2000s:

Bonds to match
scheme liabilities

Mid 'noughties':

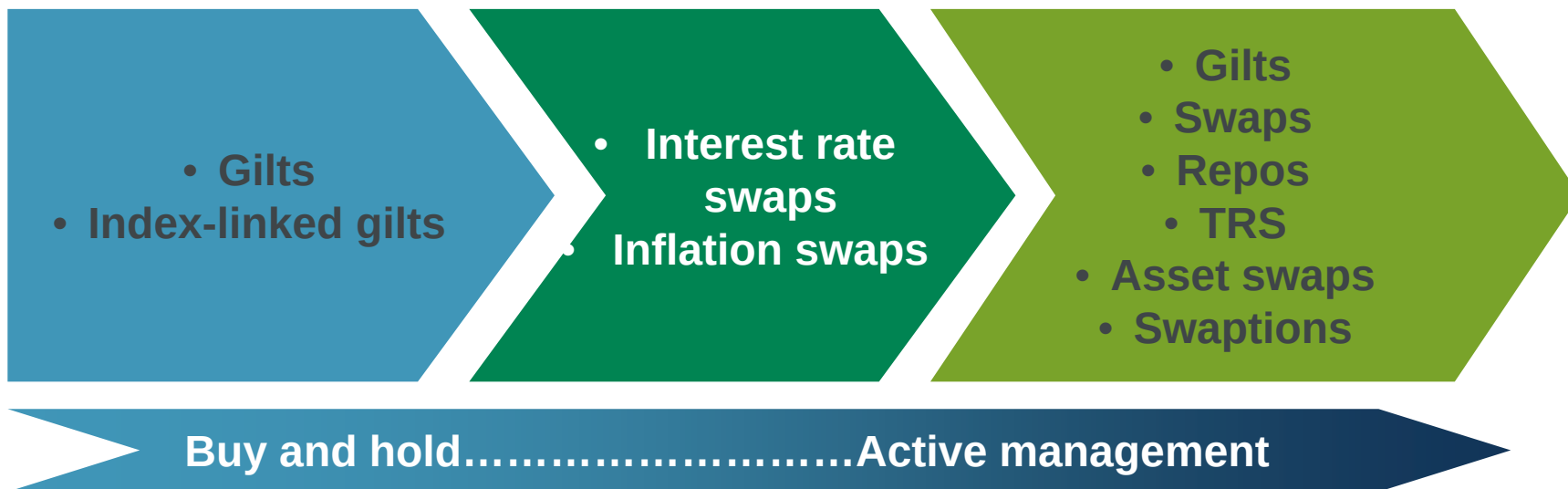
Derivative
overlays

Post crisis

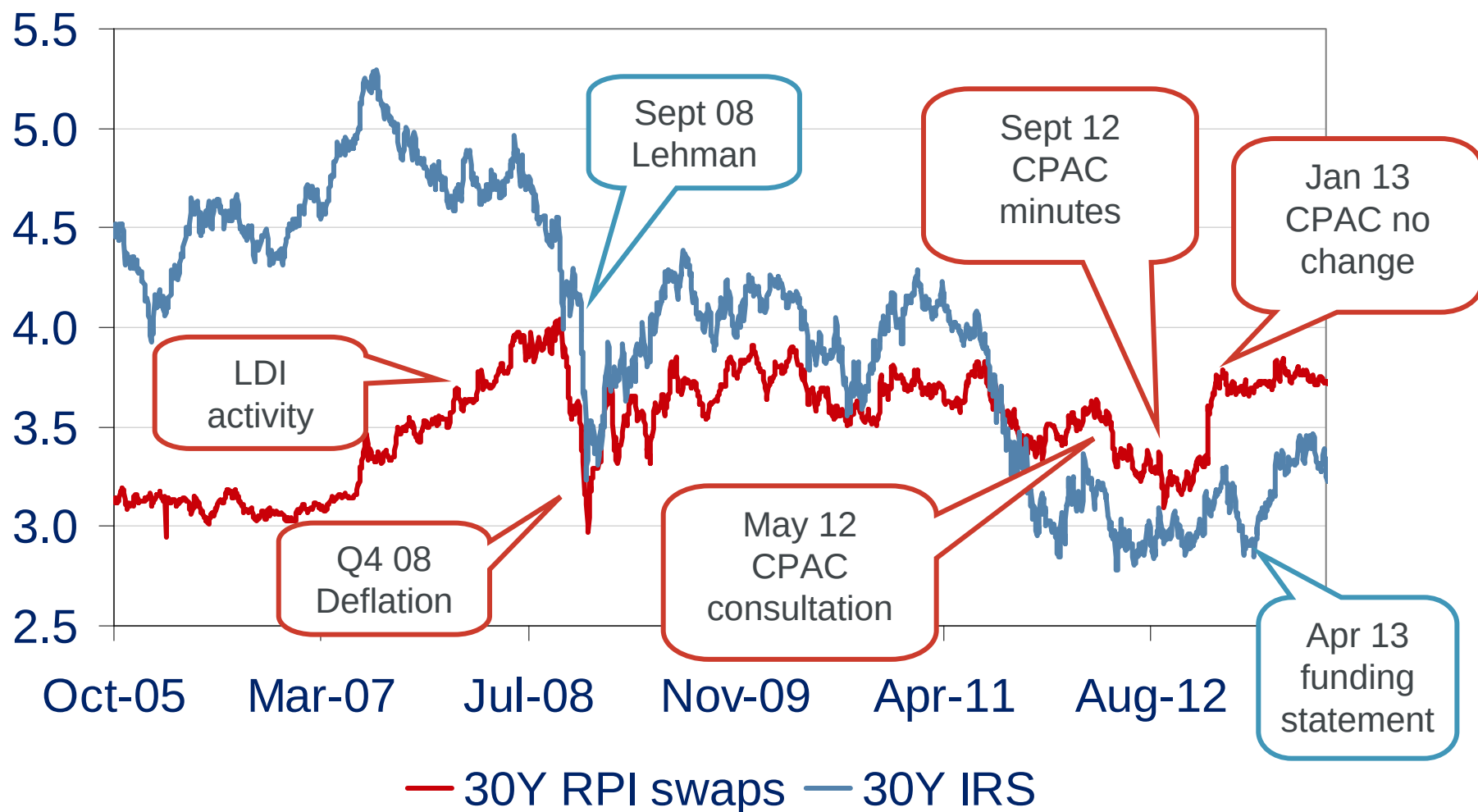
'Active' LDI

Wider LDI toolkit

Pooled vs. segregated



GBP 30yr RPI & IRS swaps



Source: RBS

LDI toolkit

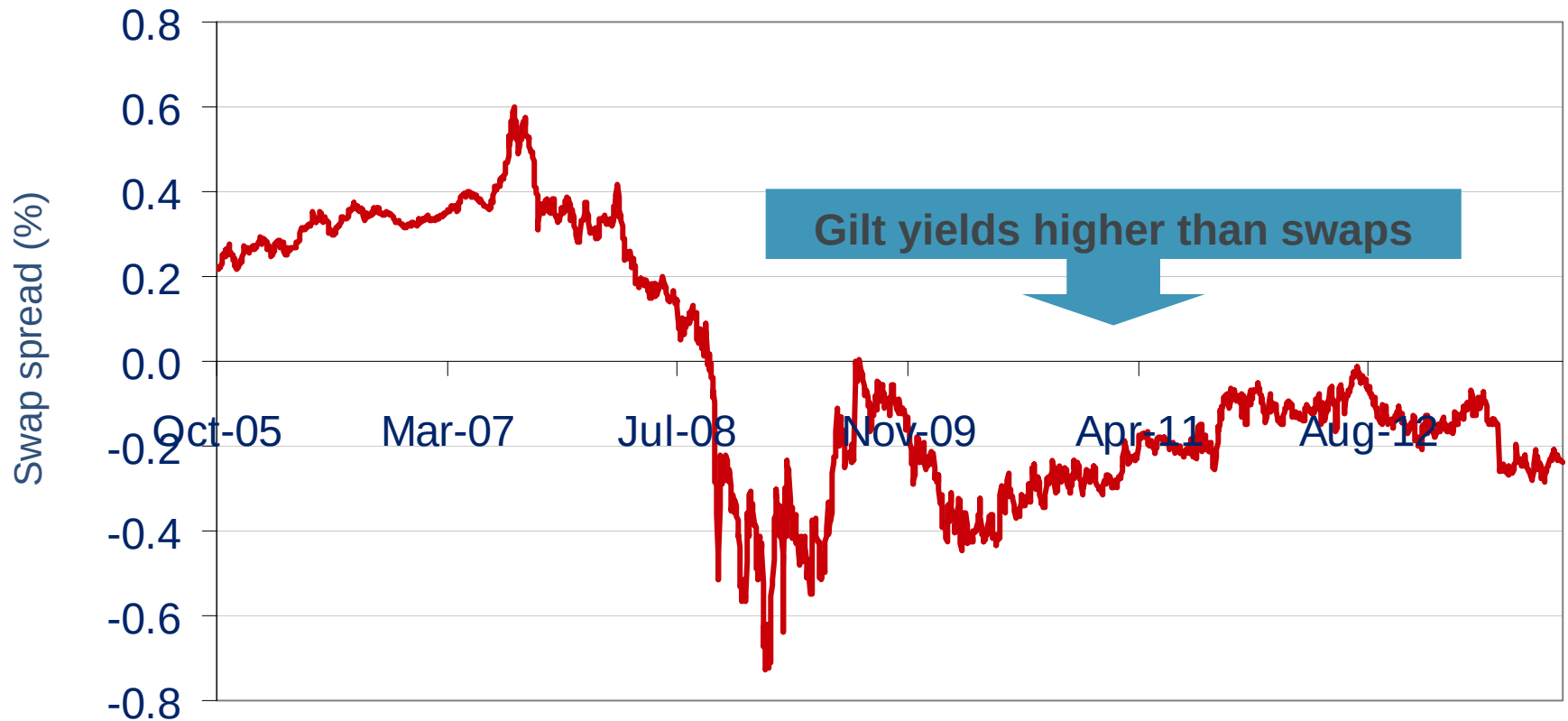
- Gilts – nominal/inflation
- Swaps – IRS/RPI
- Gilt TRS/Repo
- Swaptions
- Value hedging
- Rates vs. inflation
- Recouponsing/CSA clean up



Gilts versus swaps

	Gilts	Swaps
Upfront payment	Funded	Unfunded
Documentation	N/A	ISDA/CSA
Counterparty risk	UK Sovereign Risk	Yes – mitigated through collateral
Real yield	Historically lower	Historically higher
Further considerations	Financing Gilt purchase	Governance issues of using derivatives Need to post collateral

GBP 30yr swap spreads



Source: RBS

Asset swaps: UKTI 2042

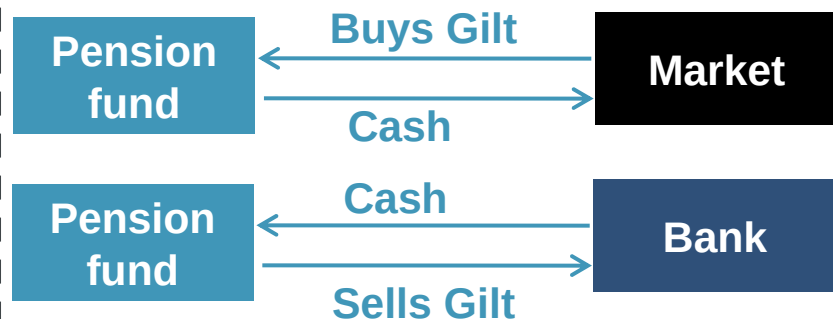


Source: RBS

Extending the toolkit

Gilt REPO

At Inception:

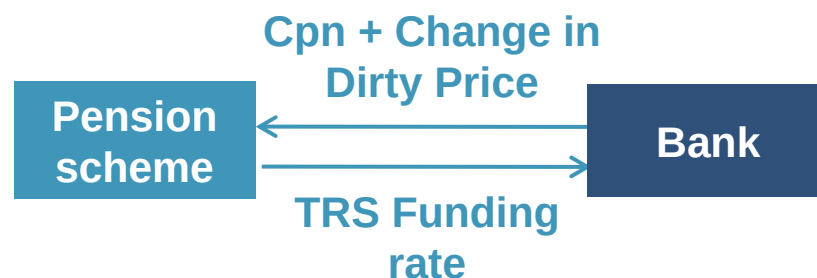


At Termination:



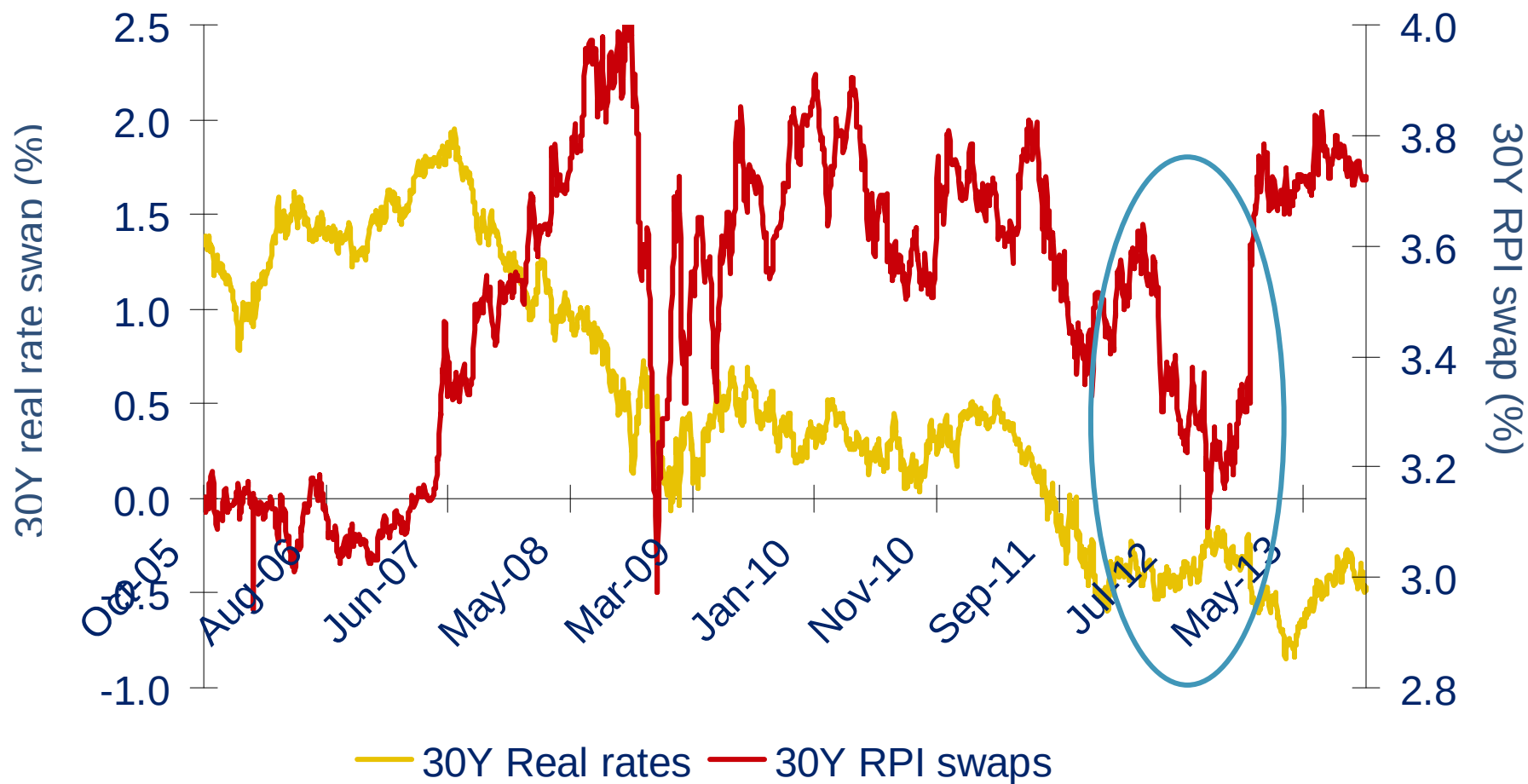
Gilt TRS

- Bank pays total return on a specified Gilt
- Pension fund makes LIBOR based payment



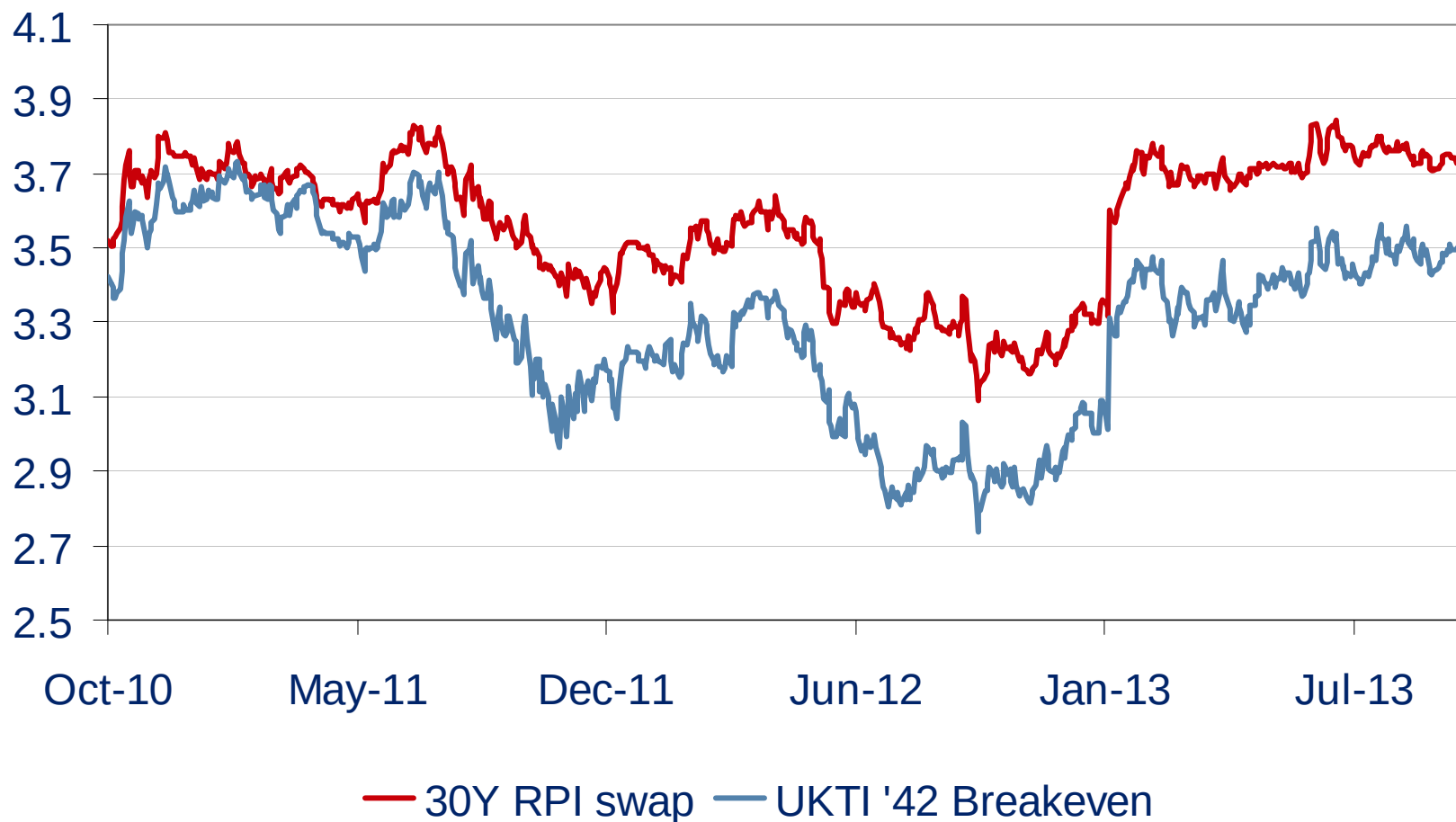
Unfunded Gilt exposure

Hedge RPI not real rates?



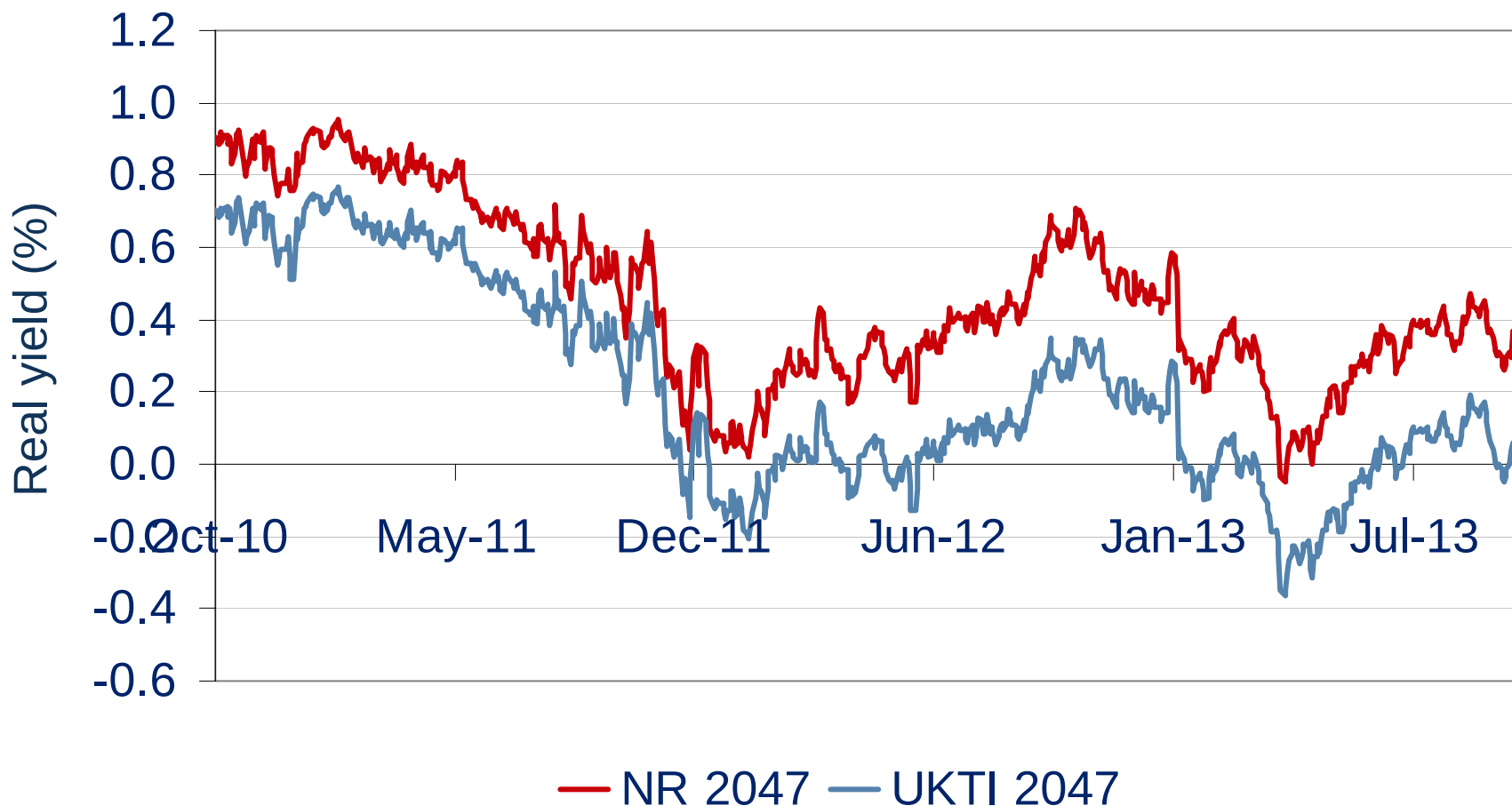
Source: RBS

RPI – cheaper in Gilt land....



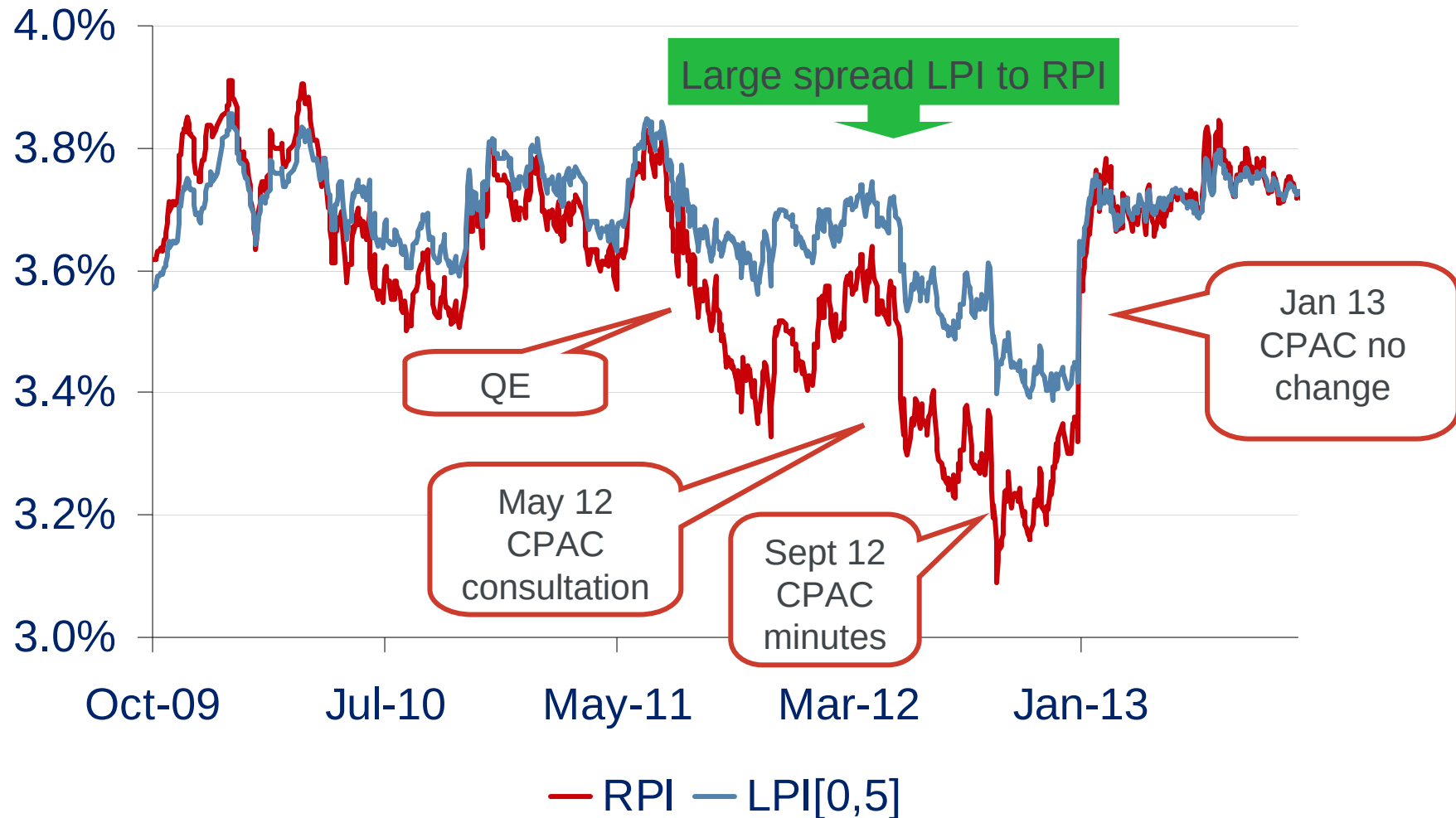
Source: RBS

Network Rail – government guaranteed



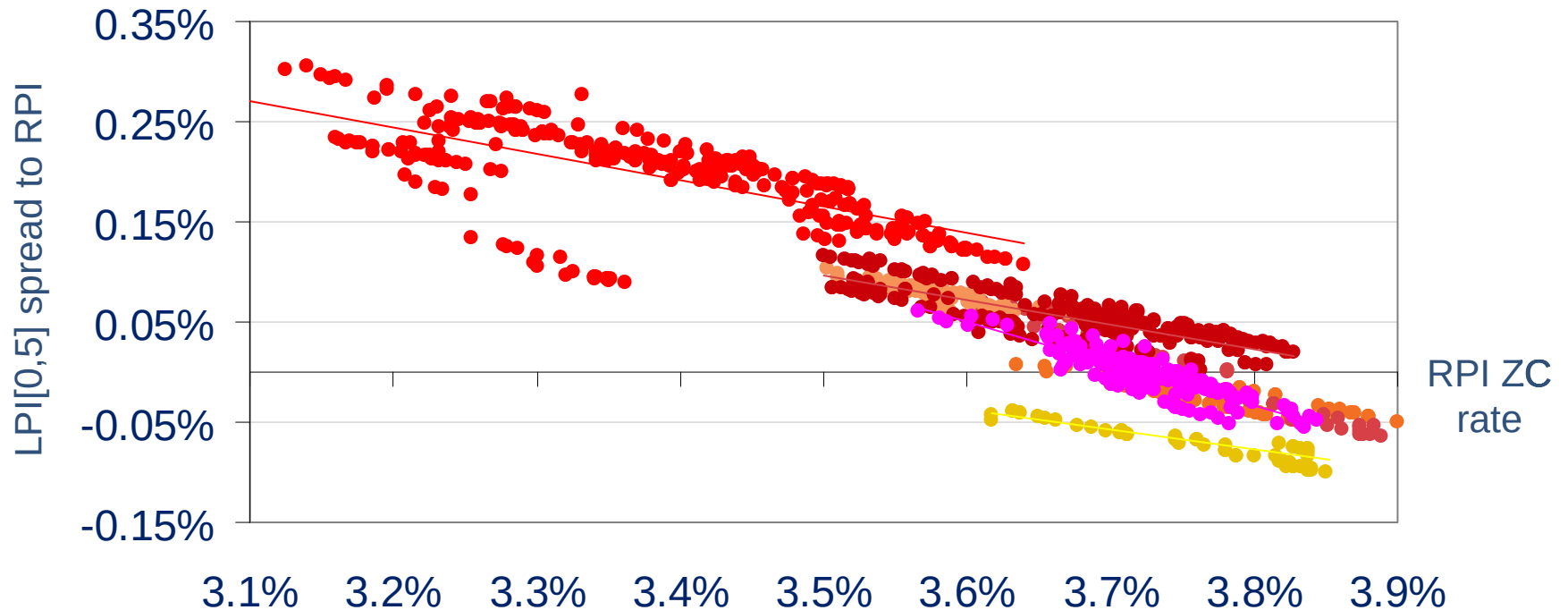
Source: RBS

30 yr LPI[0,5] vs RPI



Source: RBS

30 yr LPI[0,5] vs RPI



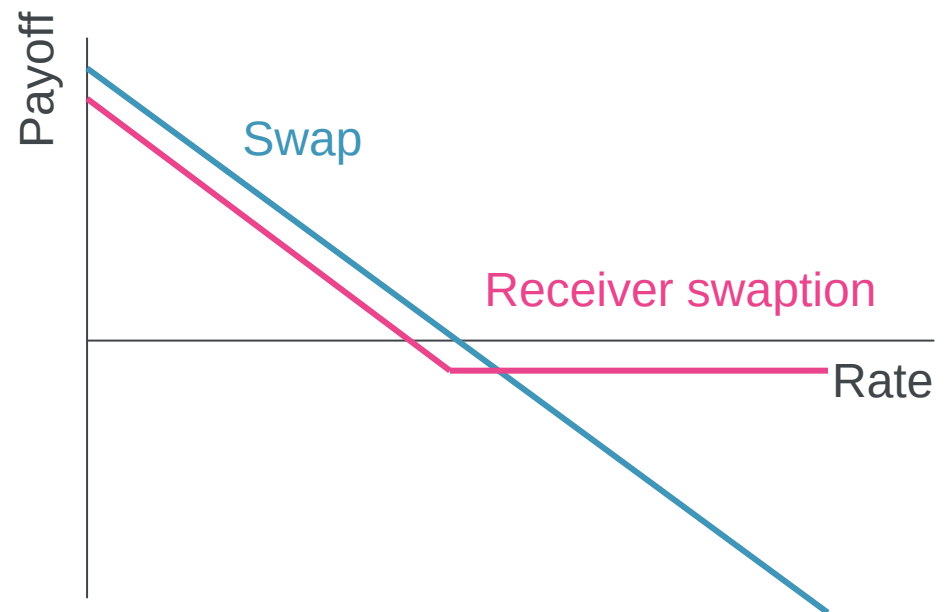
- Oct 09 - Dec 09 ● Jan 10 - Mar 10 ● Apr 10 - Jun 10 ● Jul 10 - Sept 10
- Oct 10 - Oct 11 ● Nov 11 - Jan 13 ● Jan 13 - Oct 13

Swaptions

- Option to enter into a swap

Receiver swaptions

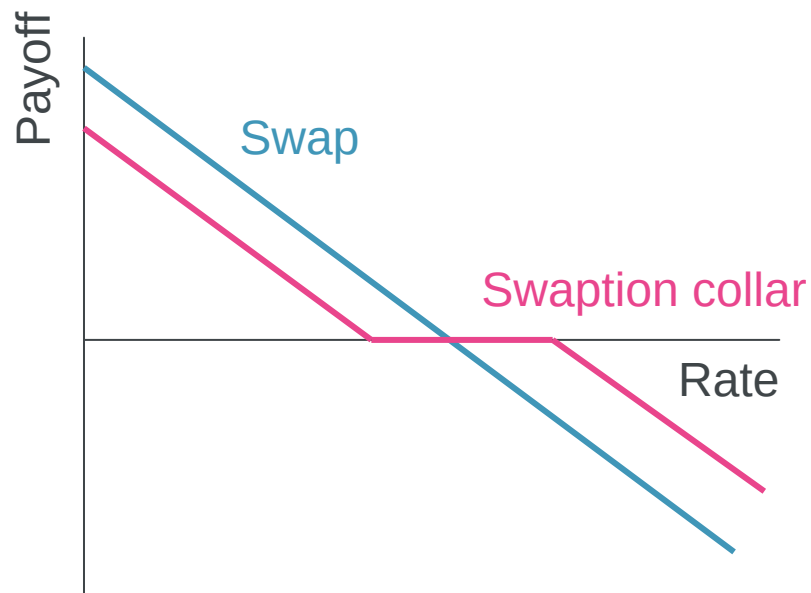
- Pay premium to hedge against fall
- Keep upside



Swaptions continued

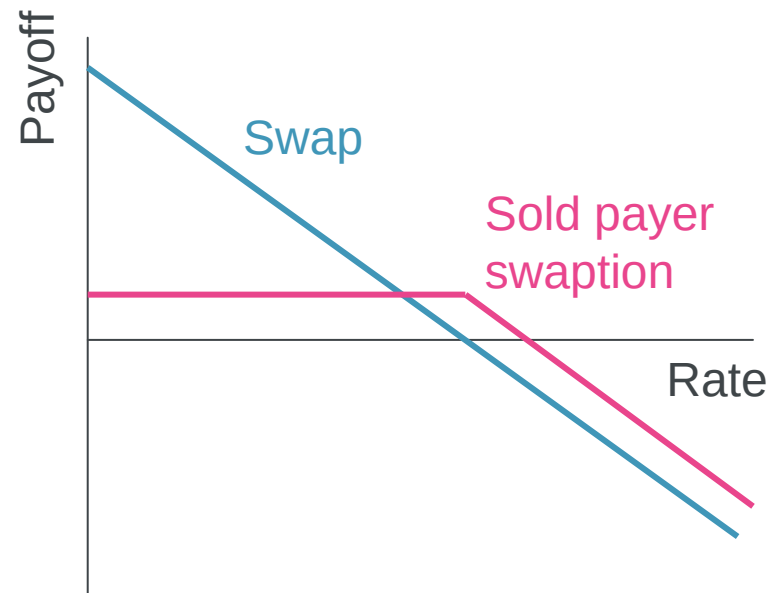
Zero premium collar

- Buy a receiver swaption
- Sell a payer swaption

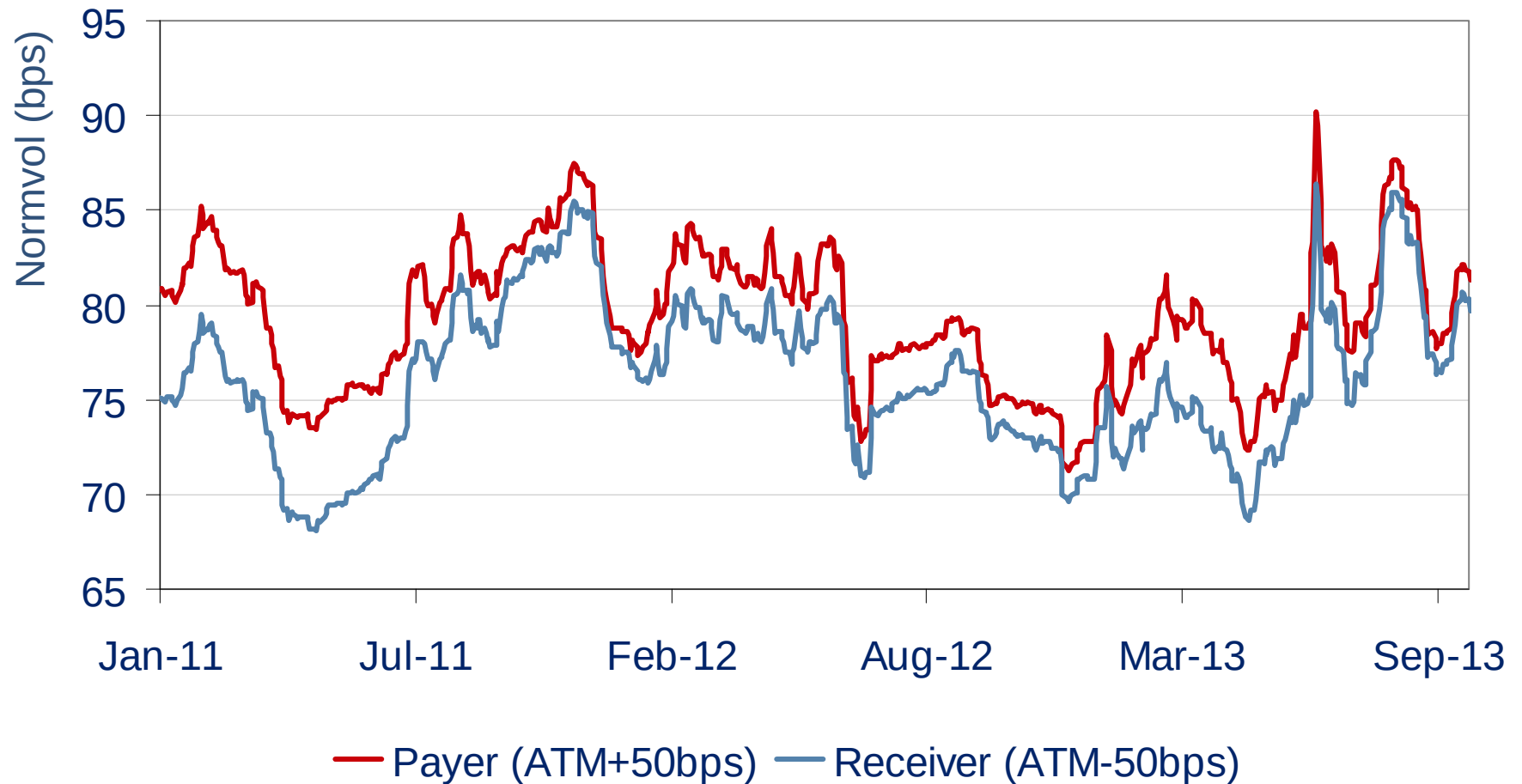


Sell payer swaption

- Monetise trigger
- Receive premium to lock into target levels



Swaption skew – 3Y15Y



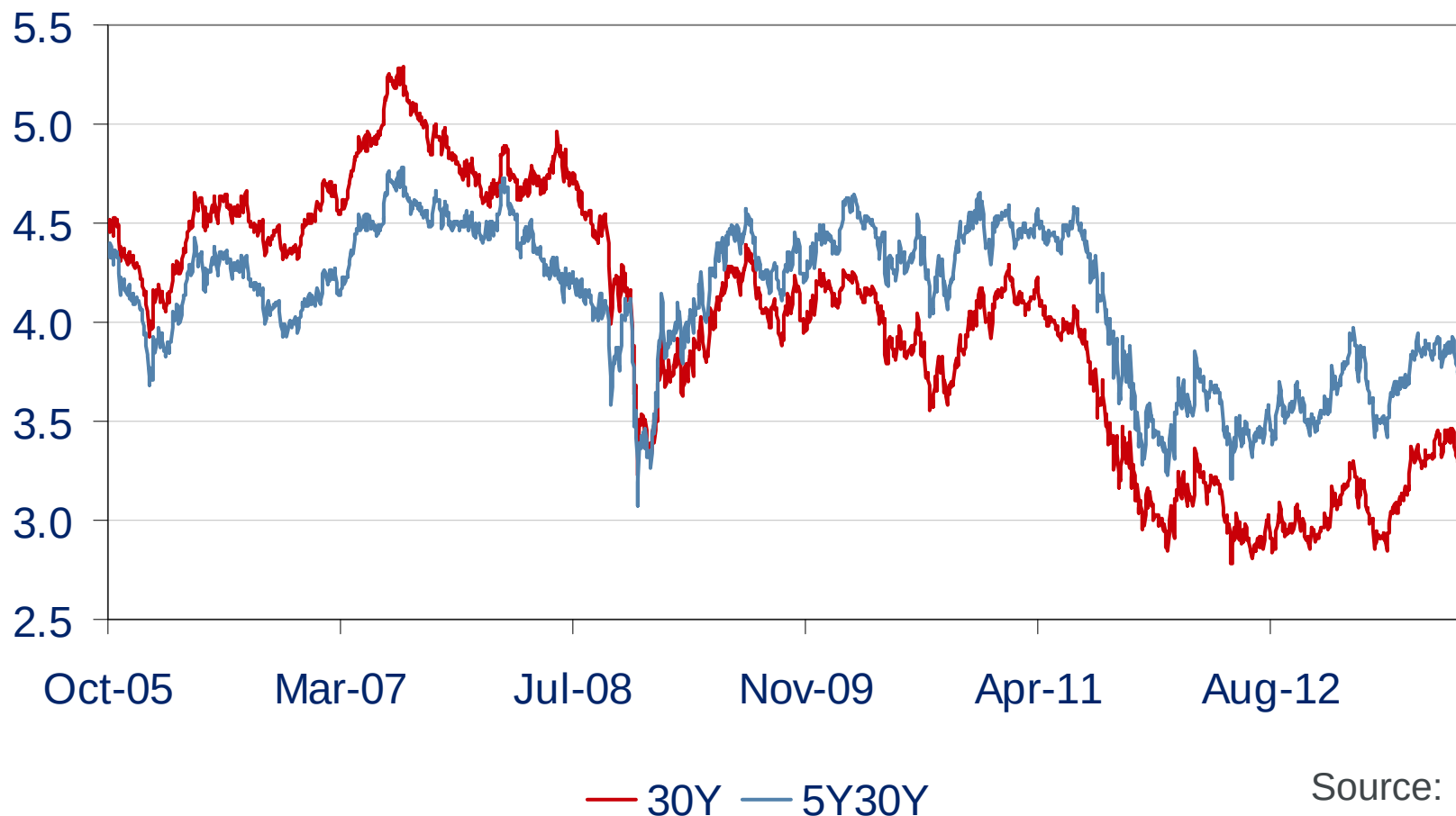
Source: RBS

ATM vol – buy short dated sell long



Source: RBS

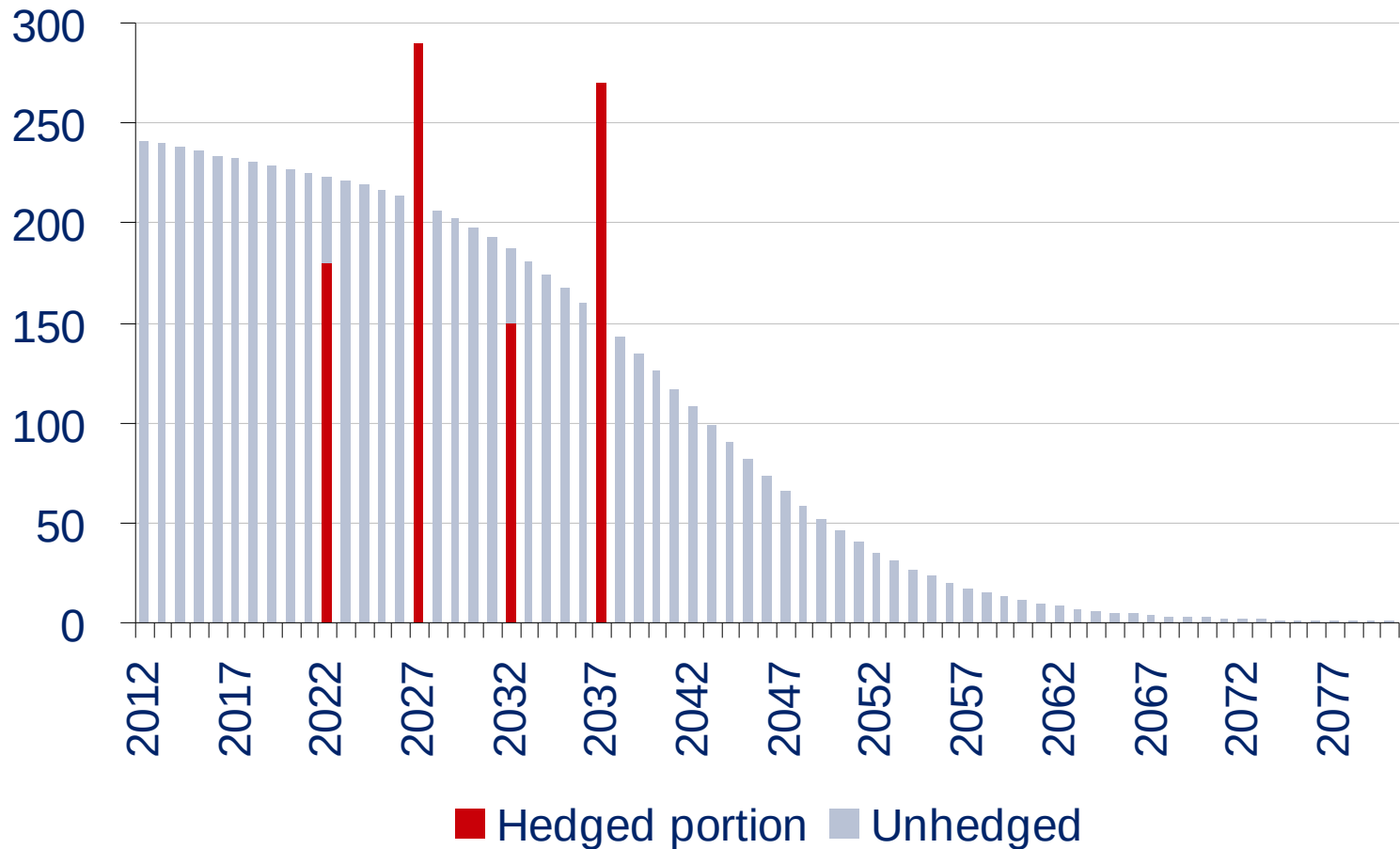
Forward rates



Source: RBS

Forward starting trades offer better value

Value hedging



Recouponsing



Source: RBS



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A portfolio managers perspective

Applications and considerations

What's different in insurance?

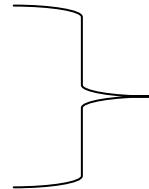
	Pensions	Insurance	
		Pillar 1	Solvency II/ICA
Liability discount rate	Accounting: AA corporate bonds Funding: Gilts + asset spread	Risk adjusted yield on assets WP: Gilts/Swaps	Swaps + matching adjustment?
Capital		20% long-term gilt yield	99.5% 1yr VaR
Degree of interest rate hedging	Significant variation in hedge ratios	Well hedged	
Liabilities	Predominantly inflation linked	Fixed – although BPA increasing % linked	

Moving from Pensions to Insurance

Liability Basis is well defined

Projected cashflows combined with discount factors implied by either

- Swap rates
- Gilt yields



Liability valuation independent
of assets held

Risk Based Capital

Market risk need to be considered and 99.5th percentile over 1year provisioned for

Moving from Pensions to Insurance

Annuities is a special case within insurance

- Liability valuation rate based on asset yields less deduction for defaults
- Liability value is linked to assets held
- Risk Based Capital requirement but market risk stress scenarios impact liability valuation as liability value is linked to assets held

Really an unrewarded risk?



- Risk based capital: all risks considered at same level
- No longer bias towards specific risks
- Diversification effect

Interest Rate Exposure Management

Insurers typically manage their assets such that the IR exposure replicates that of the liabilities ie no IR mismatch

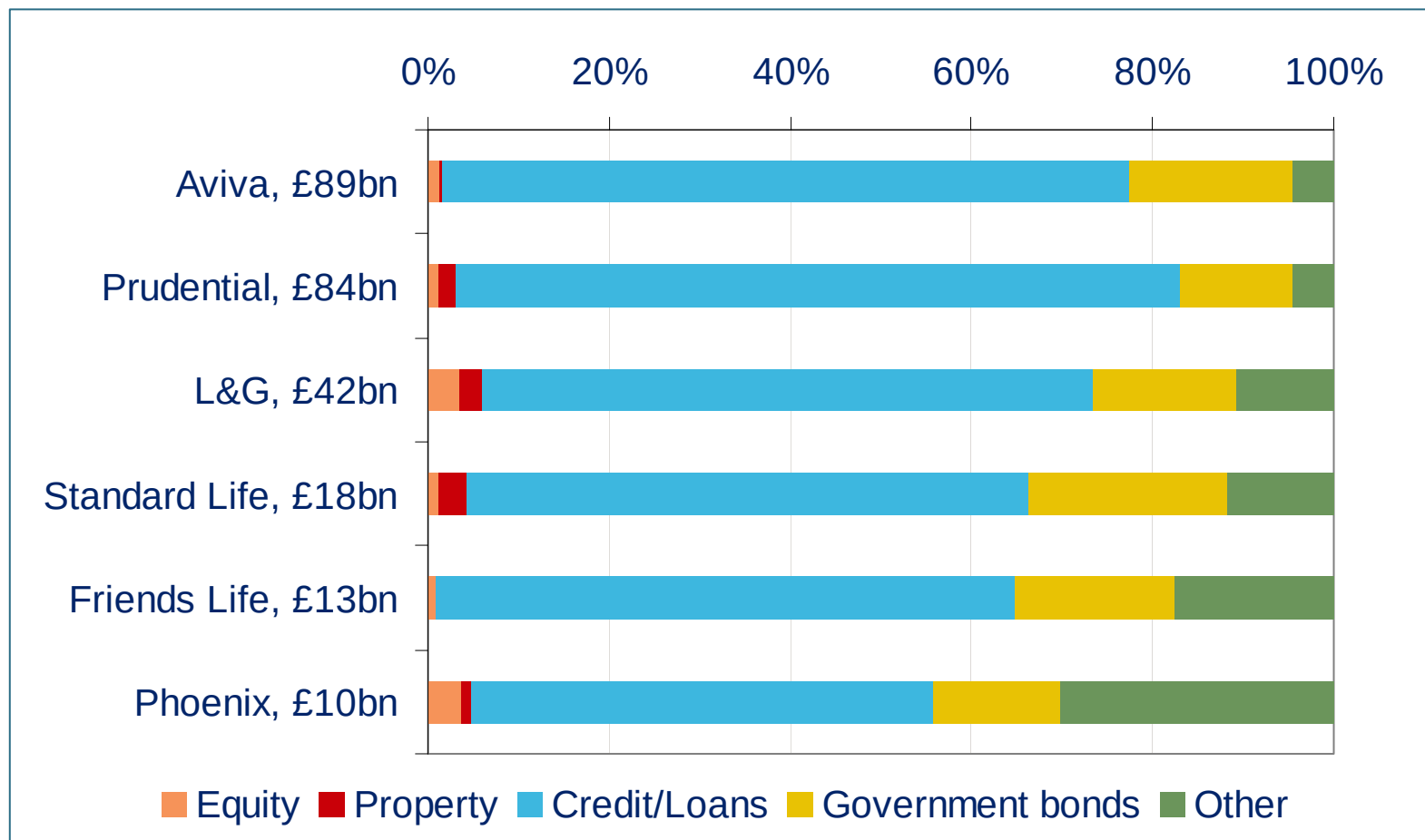
For annuities this implies cashflow matching

- Preference for negligible RBC allocated to IR risk
- IR stress scenarios are onerous
- Common active LDI strategies
 - Outright view through under or over hedging relative to target
 - 30yr IR exposure requires ~ 30% RBC ($= 1.54\% \text{ stress} * 20\text{yr duration}$)
 - Spread view through switching between swaps and gilts
 - 30yr gilt swap basis requires ~ 16% RBC ($= 0.8\% * 20\text{yr}$)

Stress	10yr	30yr
Up	1.41%	1.54%
Down	-1.27%	-1.43%

*Calibrated to historical proportional changes in IR

Insurers have large spread risk exposure

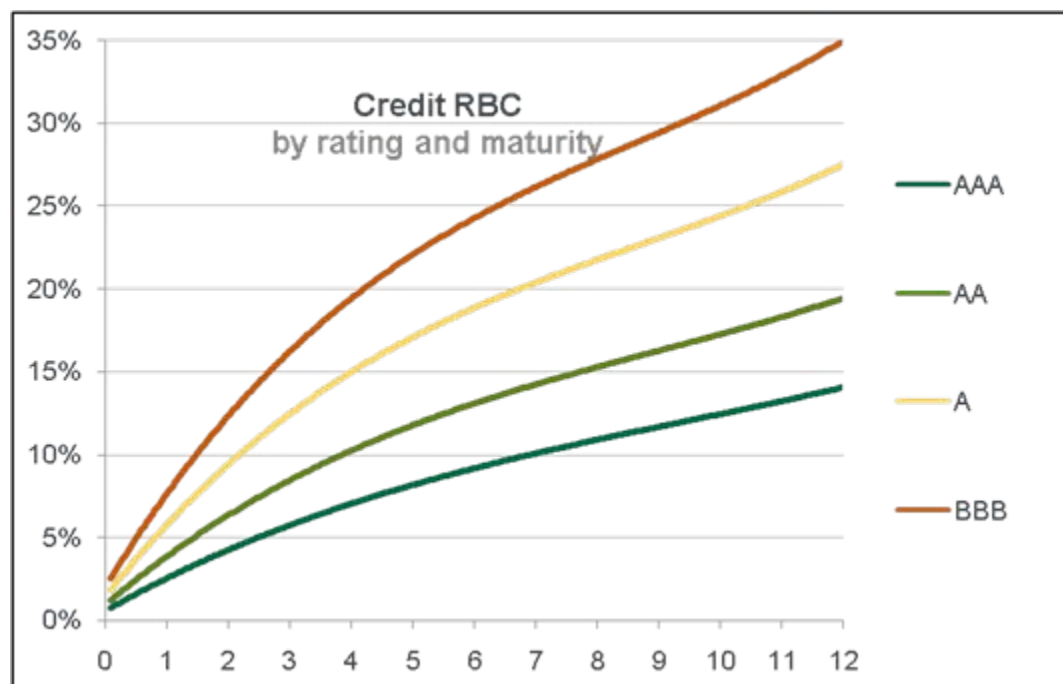


Shareholder asset exposures

Source: RBS, Company HY2013 results

Insurers have large spread risk exposure

- Credit spreads upward sloping at short maturities and flat thereafter
- RBC requirement nearly linear in duration
- Combination of RBC conservation and efficiency pushes insurers into short dated credit with residual exposures managed through swaps



Aggregating Risks

- Assume only **credit spread** risk
- Introduce **interest rate** risk
 - 25% of credit spread risk
- Only increases in Market Risk by:
 - 3% in the IR down scenario
 - 14% in the IR up scenario

Correlation	Interest Rates Up	Interest Rates Down
Credit Spread	0%	50%

IR RBC relative to Spread RBC	Marginal additional RBC	
25%	3.1%	14.6%
50%	11.8%	32.3%
100%	41.4%	73.2%

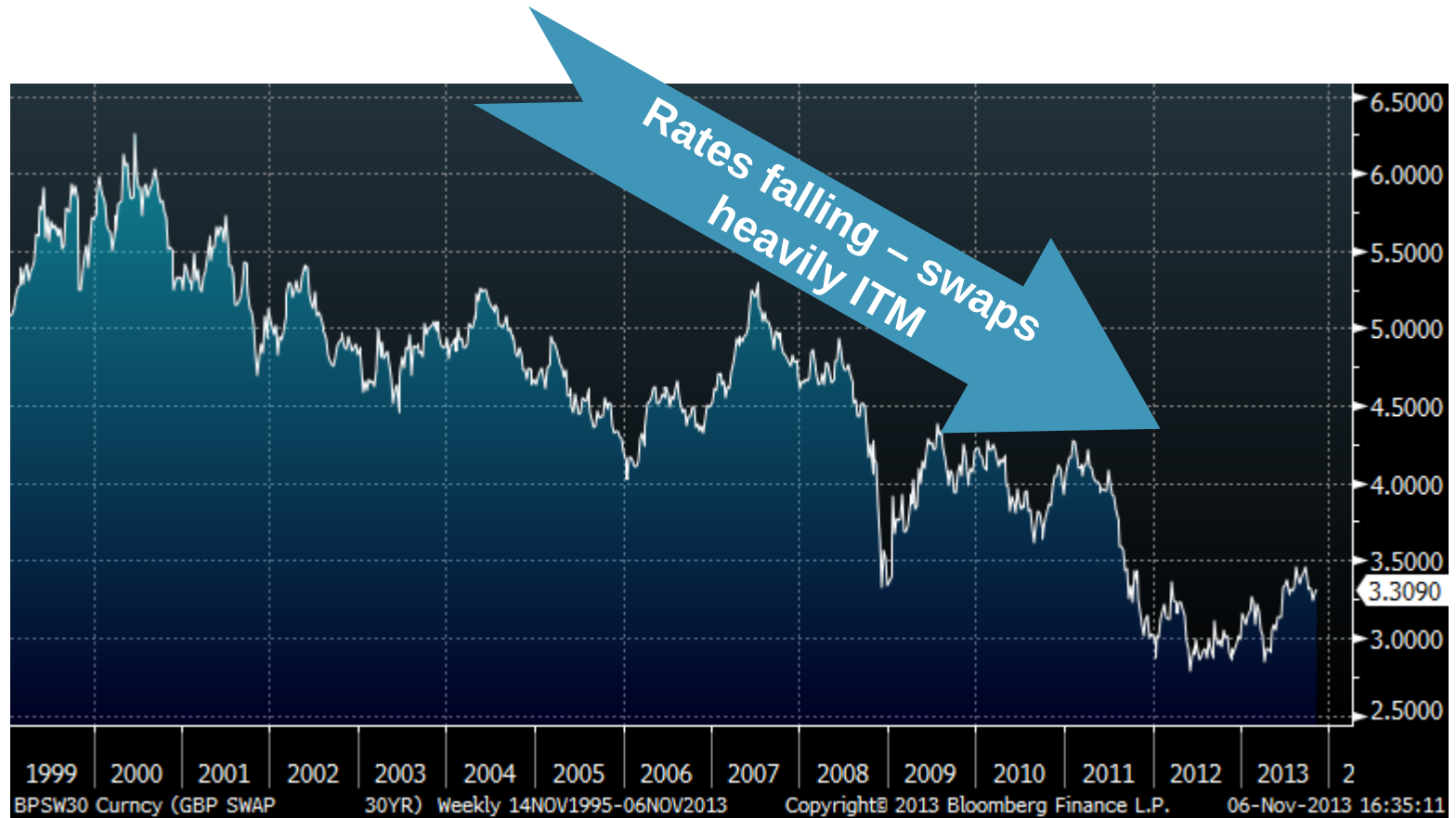
Spread risk and Interest Rate risk diversify well

*Solvency II Technical Specifications

TRS and Repos

- Insurers can benefit from following PFs widespread use here
- Gilt based insurers can use TRS to match out IR exposure
- For swap based insurers it allows more efficient credit spread allocations by being able to construct forward credit exposure
- Annuity funds can use TRS on gilts to fill in asset gaps they may have resulting in a more efficient position than using receiver swaps

Recouponsing



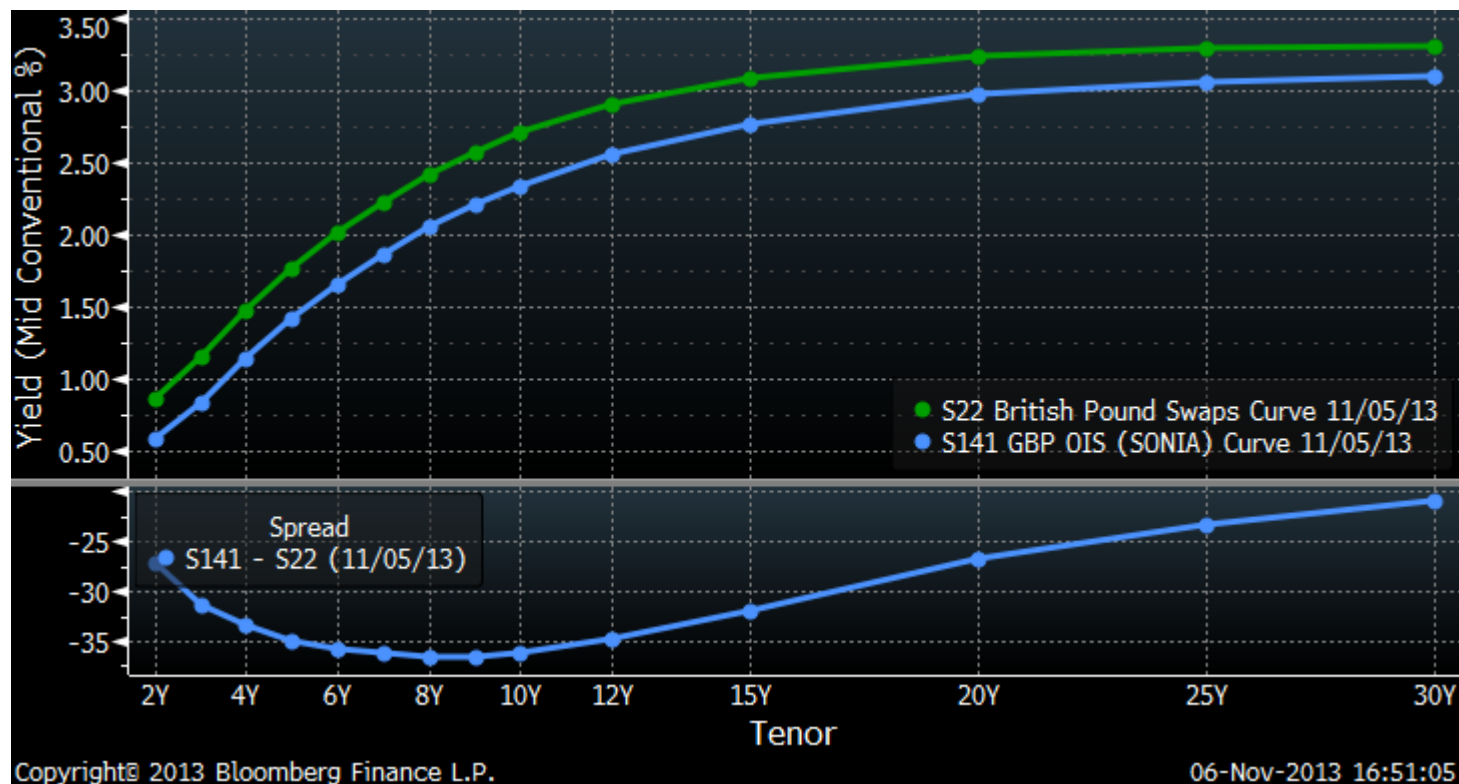
30Y swap rate

Active derivative management

- The yield of an OTC derivative is dependent on the eligible collateral agreement between counterparties
- In most cases this is ~SONIA
- So an ITM swap is an asset that yields SONIA which is sub Libor and therefore inefficient
- Converse is true for an OTM swap
- Restriking ITM swaps gives you cash upfront to invest in efficient assets and you are effectively getting a loan at SONIA to purchase these assets
- In annuity framework this positive spread affect is multiplied by duration

Active derivative management

- Example: Consider two swaps one ITM and one OTM...

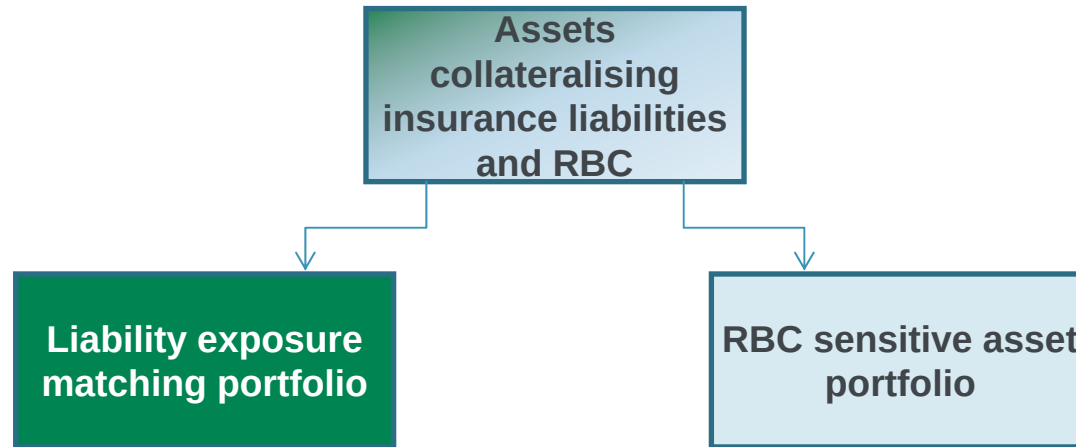


LIBOR vs SONIA

Implementation Framework

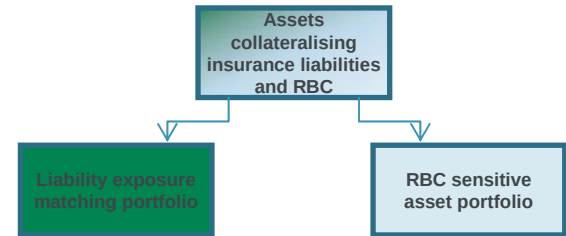
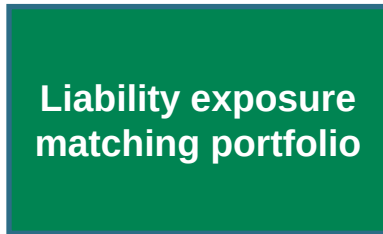
- We've discussed introducing
 - Interest rate positions
 - TRS/Repo
 - Swaptions
 - Recouping
- How can we implement this in an insurance company environment with appropriate
 - Governance
 - Oversight
 - Delegation
 - Measurement

Implementation Framework



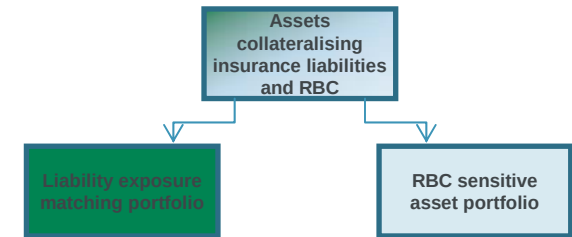
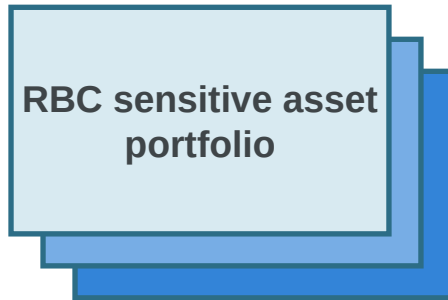
- Separating out asset component that replicates market exposures of liabilities simplifies the picture
- Clarifies objective of portfolios and therefore governance
- Simplifies performance measurement

Implementation Framework



- Market risk exposure of liabilities is set of market instruments that liabilities are calibrated to
- Potentially an instructed non discretionary portfolio
 - but discussion on value of active derivative management makes compelling argument for specifying risk grid that needs maintaining

Implementation Framework



- Can be single or multiple portfolios spanning strategies
- Zero IR exposure target
- Risk limits set using consistent risk measure
- Hurdle return rate is funding rate of liab matching portfolio
- Performance reporting simplified, as no IR exposure replication in asset portfolio so total return is all that is relevant
- Value add of investment becomes transparent

Conclusions: What can we learn?

- Interest rate risk is not **unrewarded risk**
- **Risk based capital** means risk reward should be considered in parallel to other risks
 - Diversification
- Interest rate hedging can be more **opportunistic**
 - Focus on value hedging opportunities
- **ALM expertise** developing within insurers





Questions



Comments

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The views expressed in this presentation are those of the presenter.