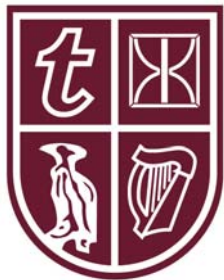


Hedging the risk-free rate under Solvency II

Eamonn Phelan & Ross Evans

May 2012



Say hello to our working party



Remit

- Why hedge the risk-free rate?
- How you hedge rates exposure in Solvency II world
- Focus on best estimate liabilities
- Practical considerations

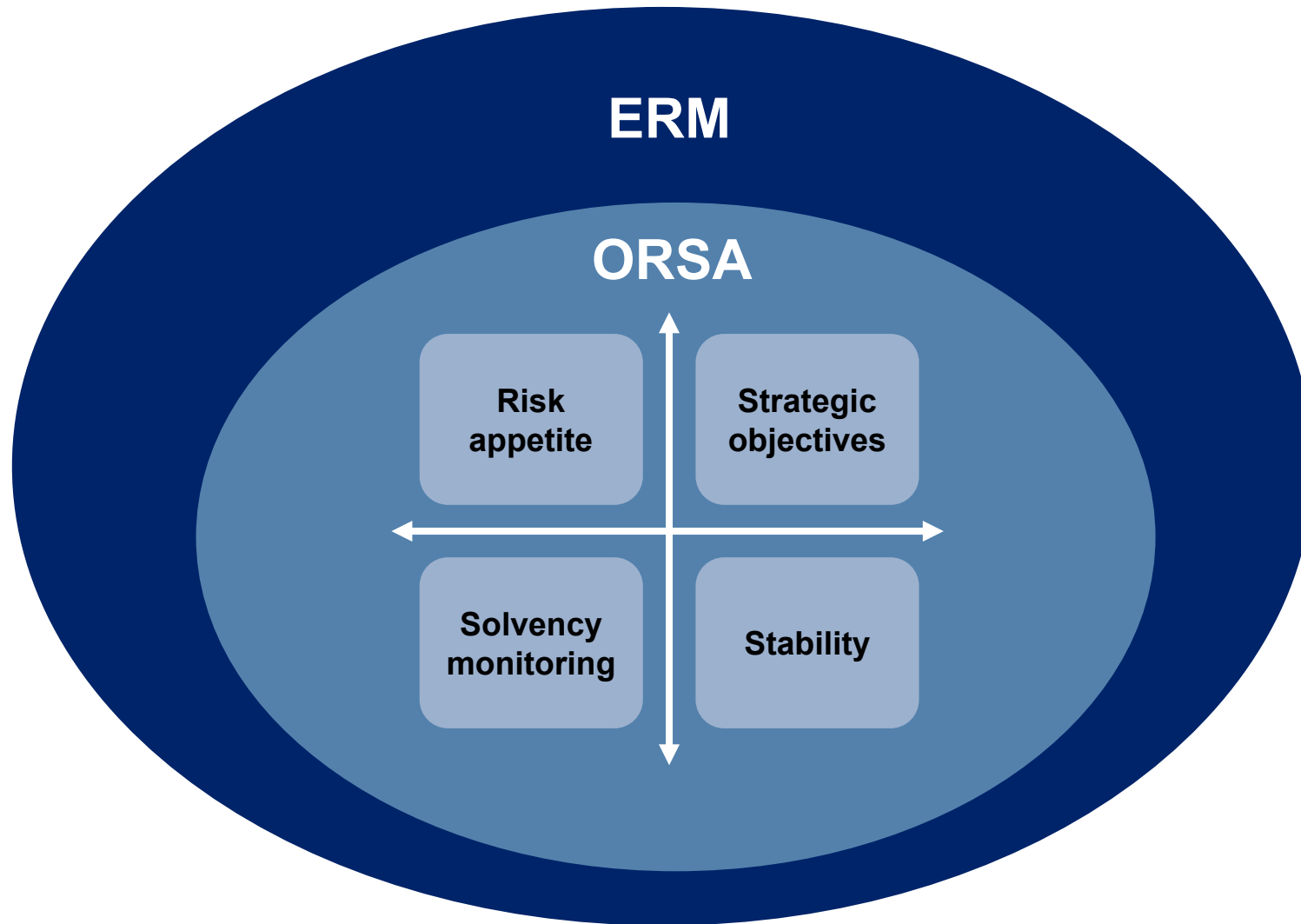
Working party members

- Alex Probyn
- Angelina Lai
- David Johnson
- Derek McLean
- Eamonn Phelan
- Emily Penn
- Oliver Firth
- Paul Collins
- Ross Evans

The views expressed in this presentation are the collective views of the working party
They do not reflect the view of any individual member, nor their employer, nor the Society of Actuaries in Ireland

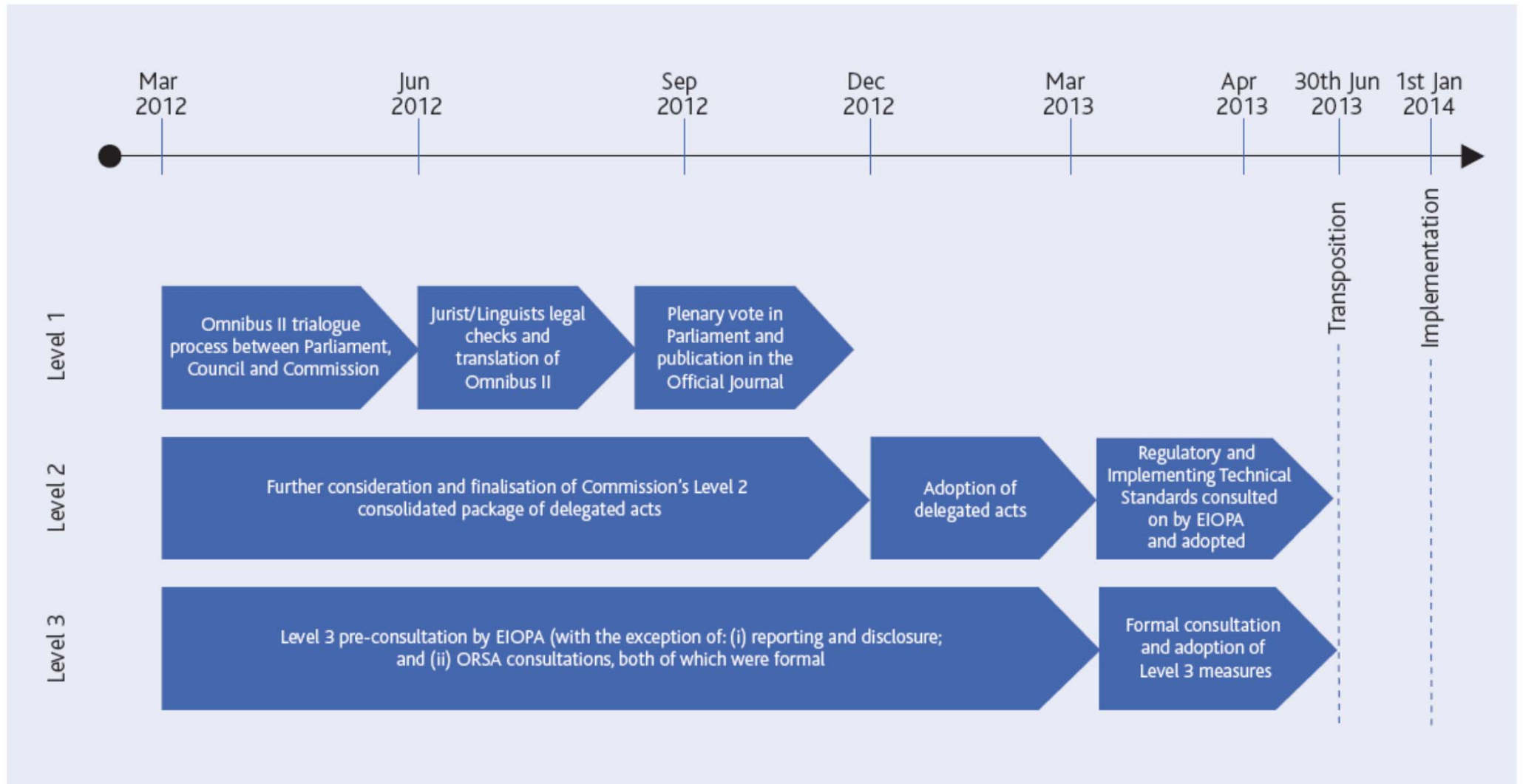
Why hedge?

Why hedge the risk-free rate in the first place?



Latest timetable & ECON Compromise

Latest edition of the Solvency II timeline



Compromises agreed at the recent ECON vote



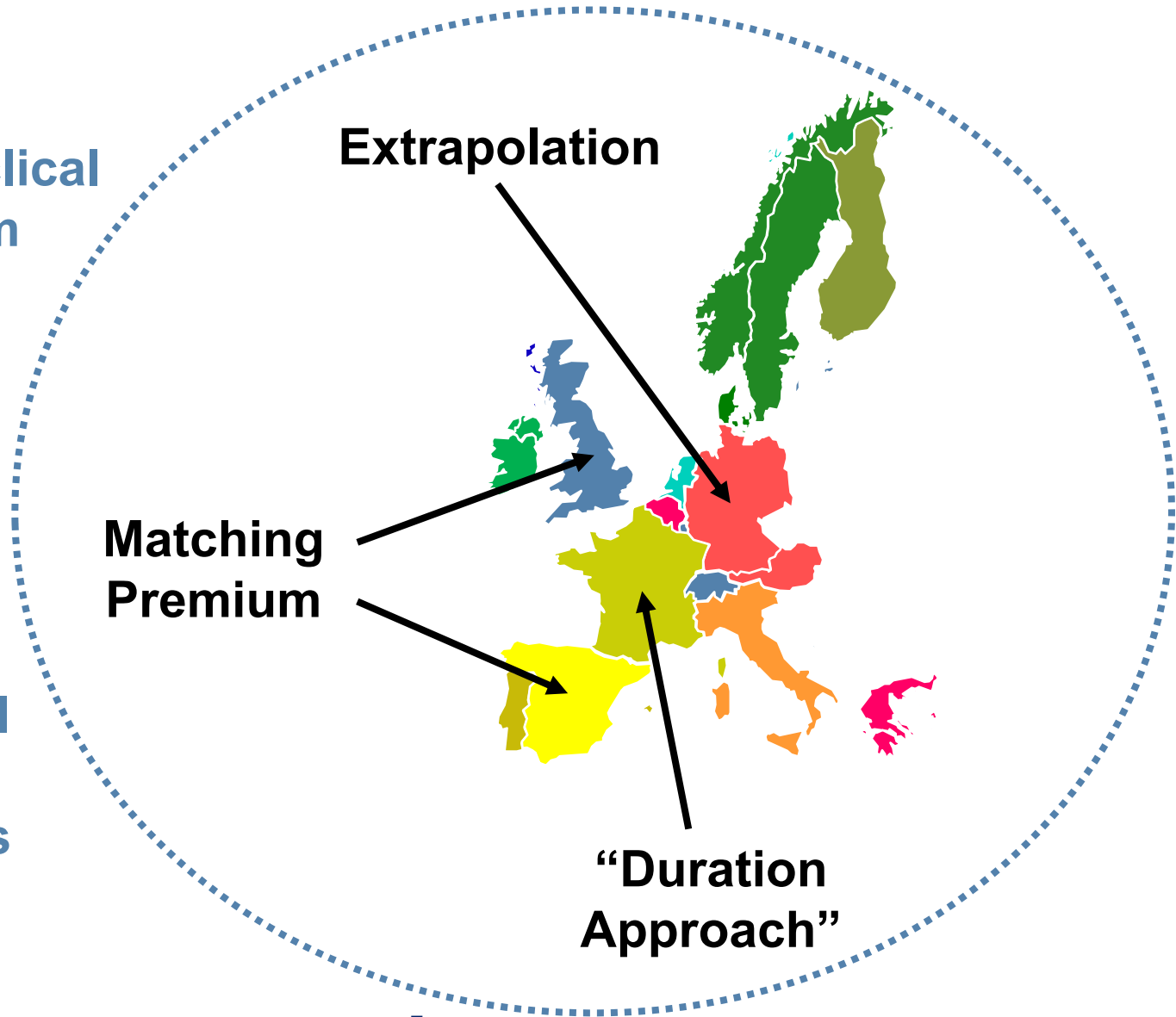
Countercyclical
Premium

Extrapolation

Matching
Premium

Symmetrical
Adjustment
Mechanisms

“Duration
Approach”



What is the Matching Premium?



Conditions!

Spread on “matching assets”

minus

“Fundamental spread”

Prior regulatory approval

Expected default & downgrade risk
Floored at 75% of long-term average spread

Conditions for application of Matching Premium ("Matching Adjustment")



ASSETS

- "Bond like"
- Fixed cash flows (or inflation linked)
- Currency matched to liabilities
- Investment grade only
- Limits on BBB
- Buy-and-hold
(Prevents active trading of portfolio)
- Tight cash flow matching
- No issuer optionality
(Assets with prepayment risk unlikely to qualify for Matching Premium)

LIABILITIES

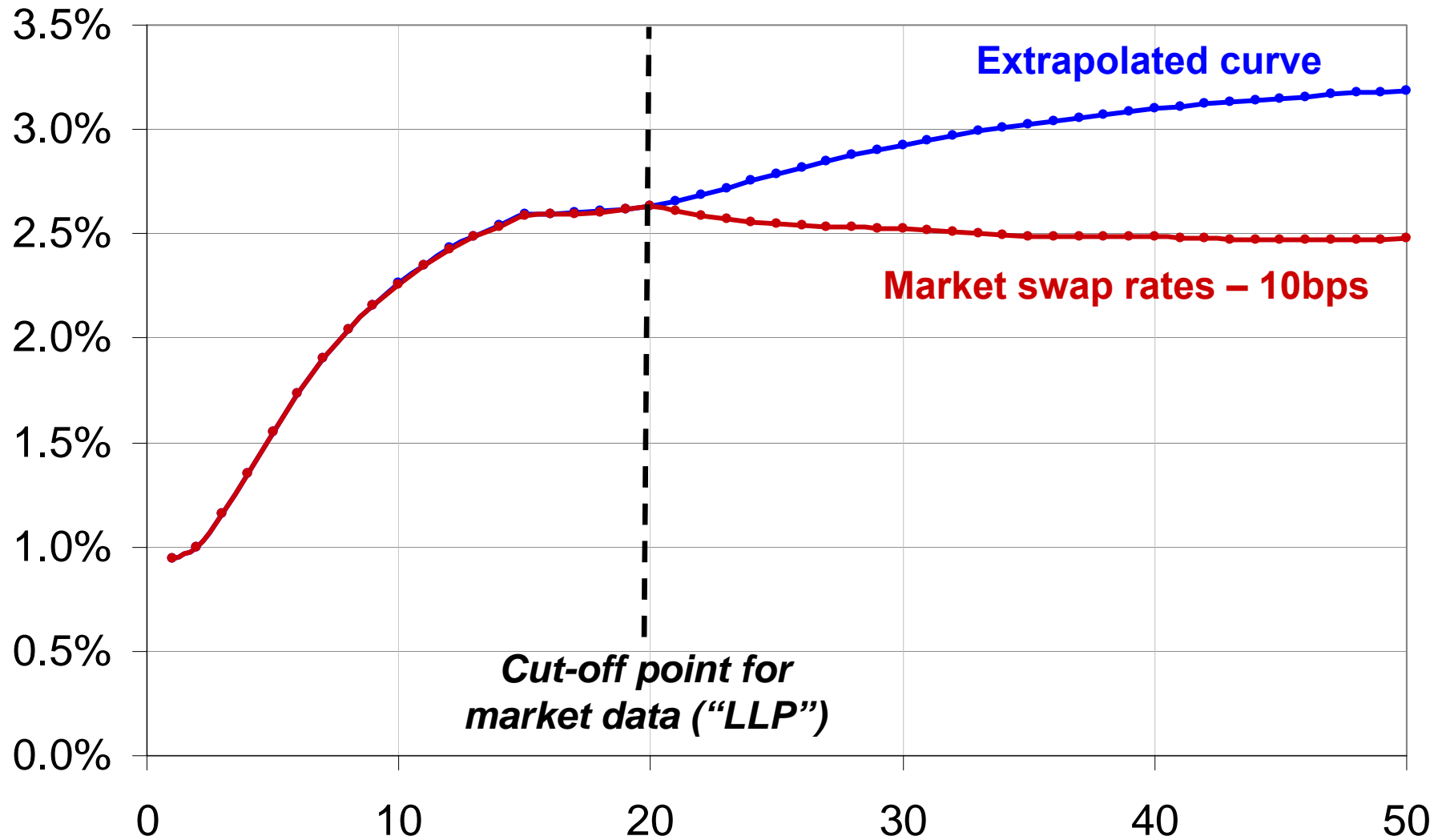
- No future premiums
- Only underwriting risks are:
Expense, Longevity & Revision risk
- No surrender option where surrender value could exceed value of underlying assets

OTHER

- Assets and liabilities must be ring-fenced without possibility of transfer
- 2 month window to restore compliance
- Restricted to insurance activities in country of authorisation

What is the risk-free rate?

The risk-free interest rate curve under Solvency II (21 March 2012)

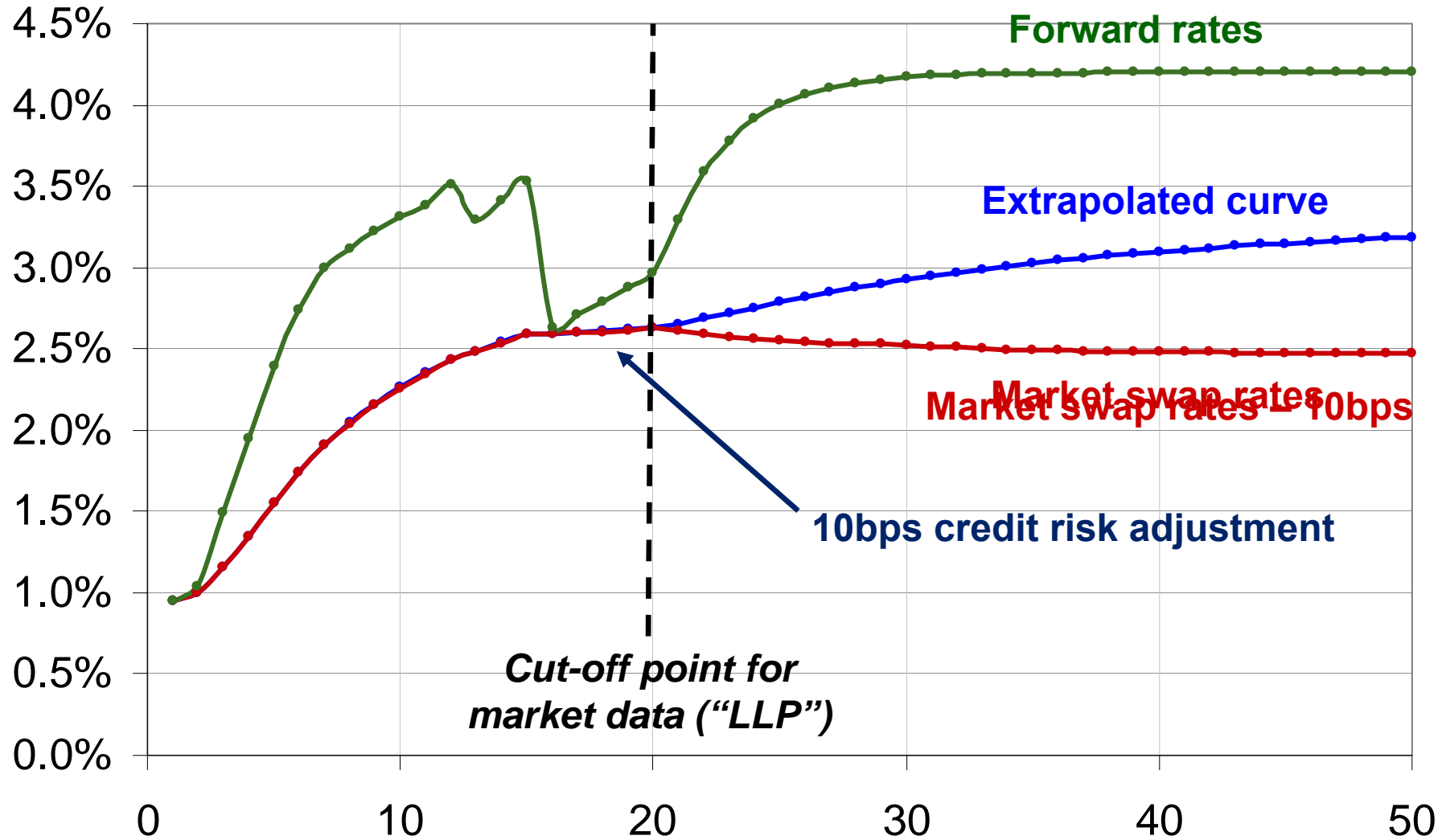


Extrapolation of the risk-free rate under Solvency II



- Extrapolation beyond Last Liquid Point (LLP)
 - Euro: now 20yrs (30yrs, QIS5)
- “Smith-Wilson” technique
- Macroeconomic approach
 - Ultimate long-term forward rate = 4.2%
 - Convergence period: 10yrs (Parliament)
40yrs (Council & Commission)
60yrs (QIS5) } **$\alpha \geq 0.1$**

What this looks like in practice (21 March 2012)



Hedging – some practical examples



Consider two simple cases

1. Case 1: Bullet 10yr liability cashflow
2. Case 2: Bullet 50yr liability cashflow

EUR 10m in each case

Delta hedging technique used to construct swaps hedge

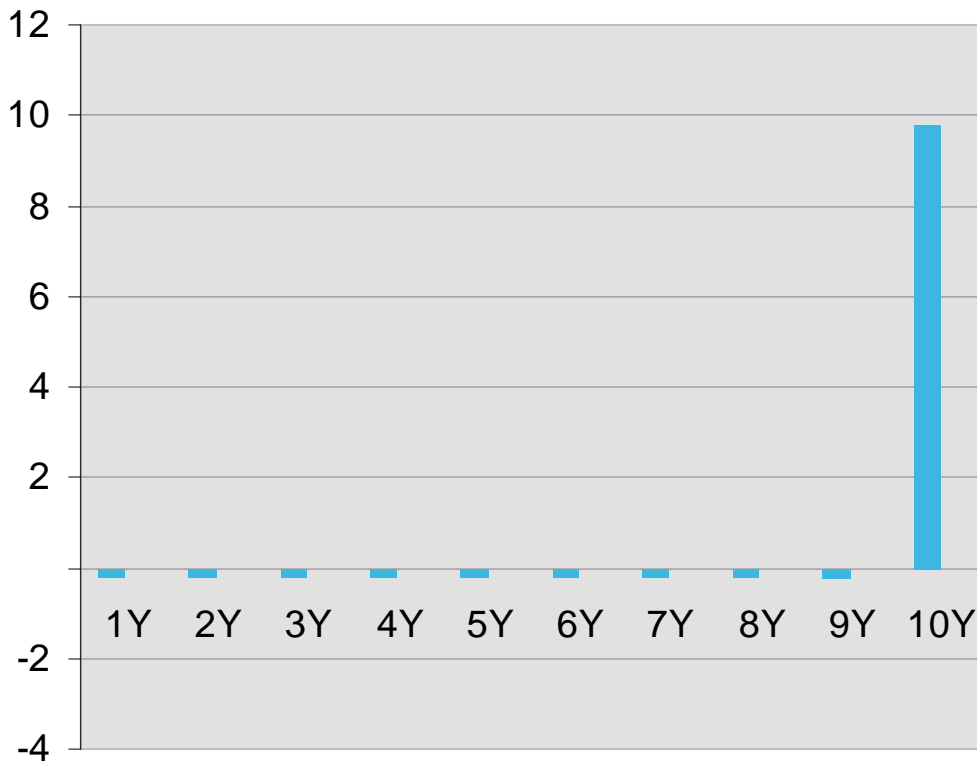
21st March 2012

Market consistent / Economic hedges



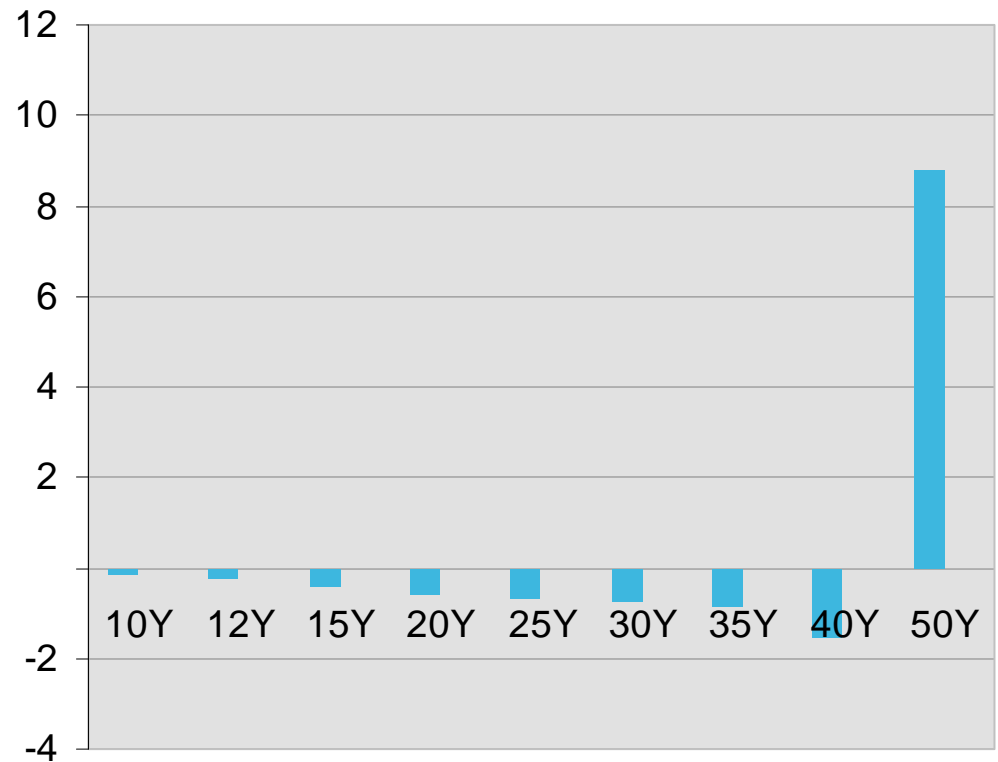
10yr bullet liability cashflow

Hedge Notional €m



50yr bullet liability cashflow

Hedge Notional €m



Remove the swaps needed to eliminate coupons



10yr bullet liability cashflow

Hedge Notional €m



50yr bullet liability cashflow

Hedge Notional €m

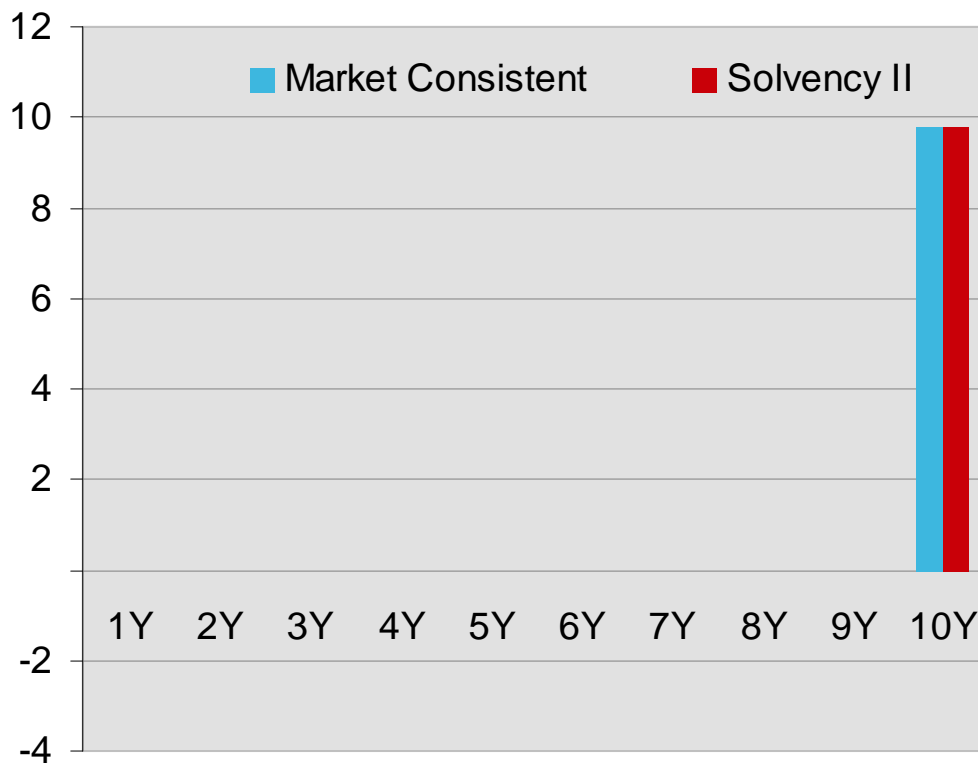


Economic hedge vs. Solvency II hedge (after removing swaps needed to eliminate coupons)



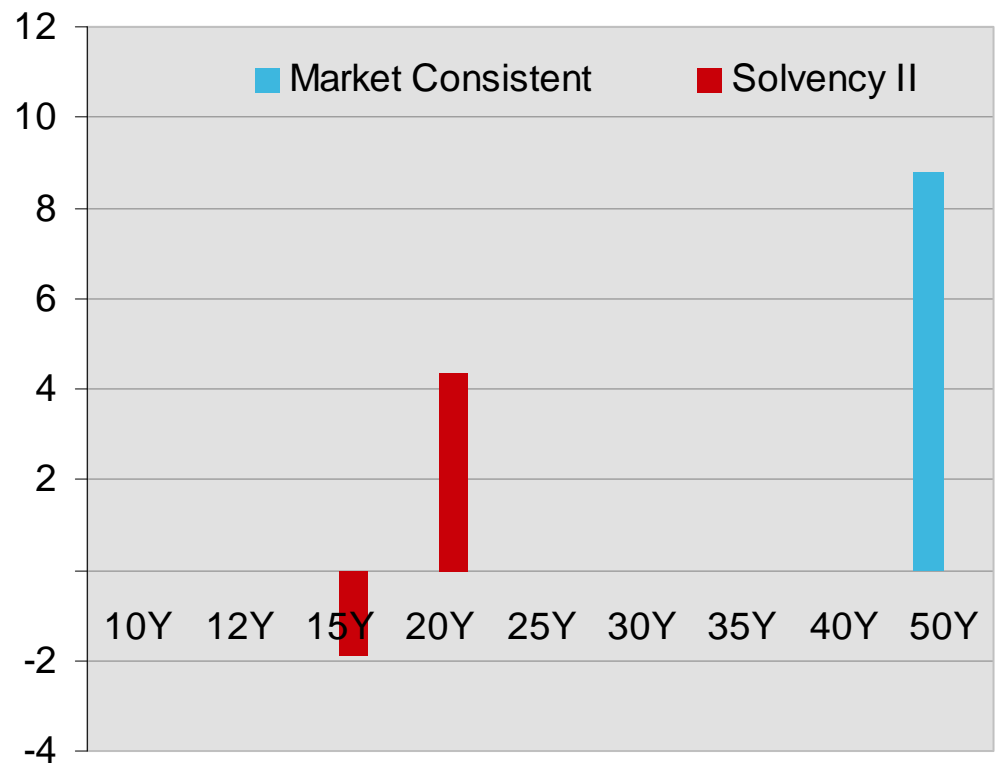
10yr bullet liability cashflow

Hedge Notional €m

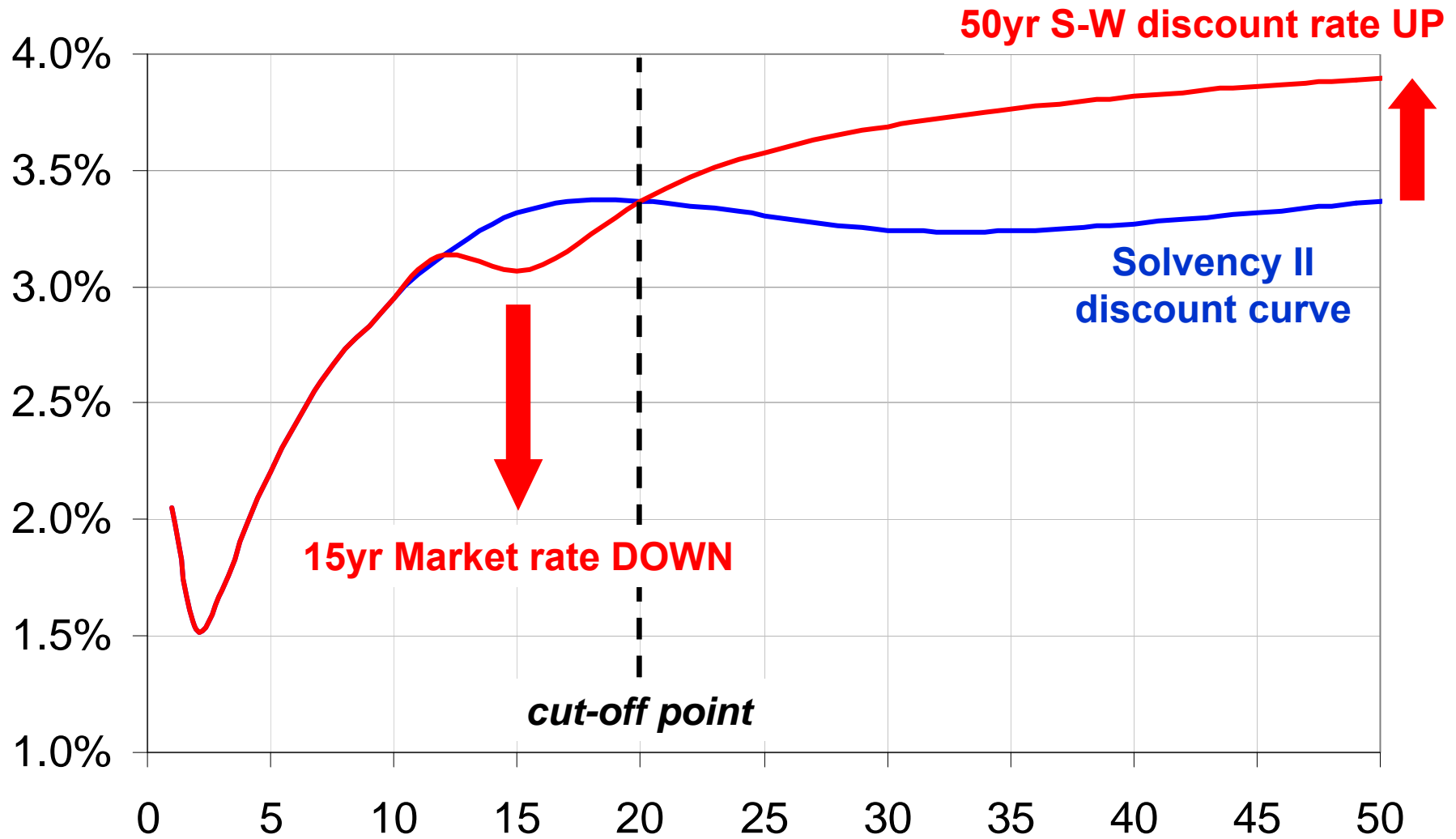


50yr bullet liability cashflow

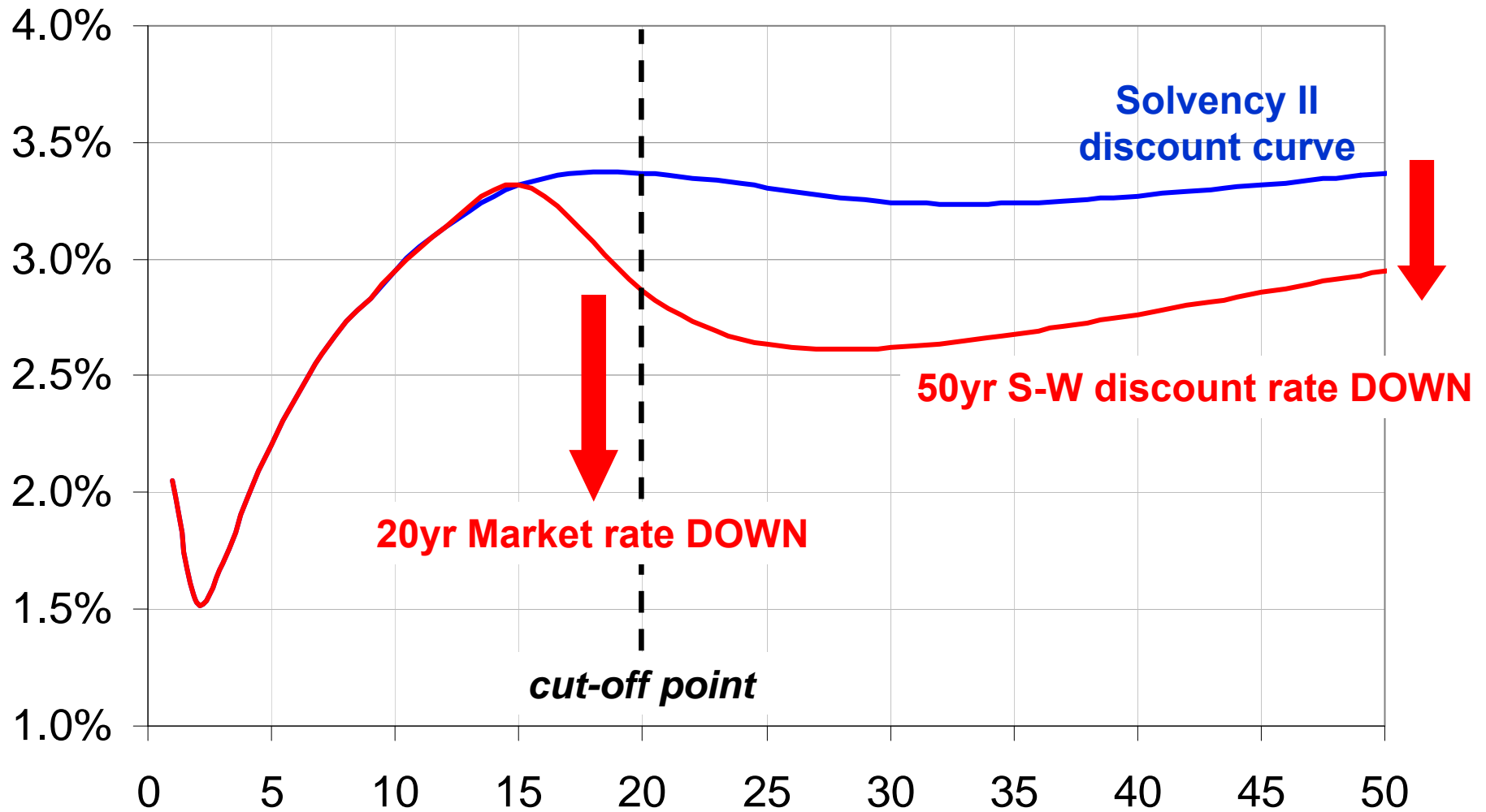
Hedge Notional €m



Slope of the market swap curve prior to the LLP



(And the other way around)

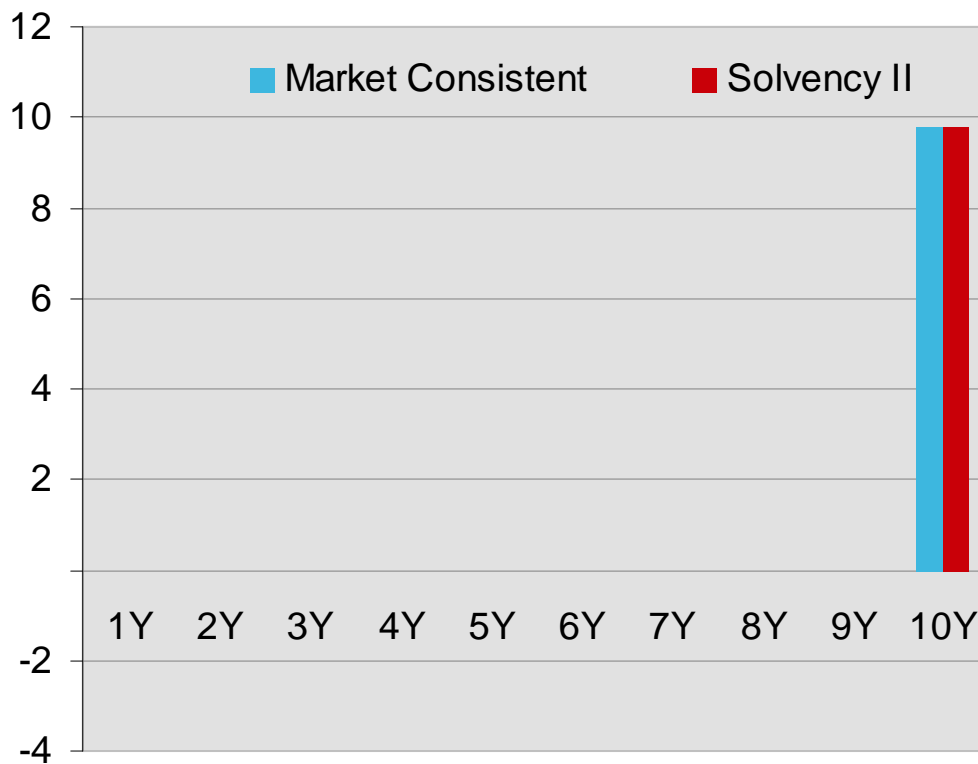


Economic hedge vs. Solvency II hedge



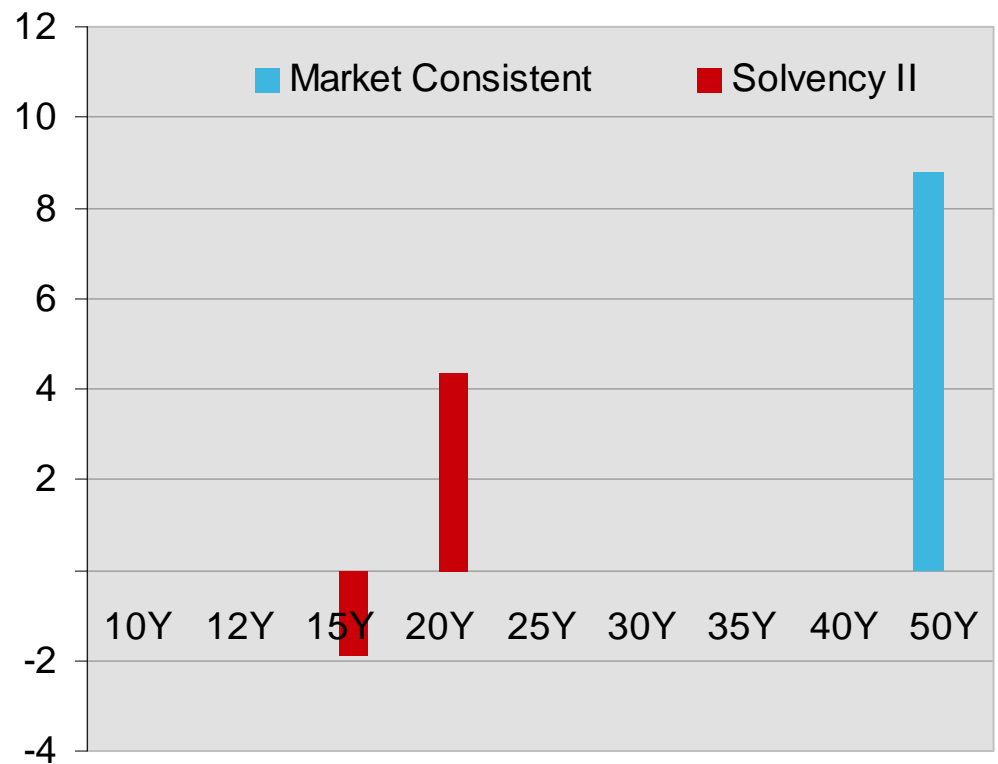
10yr bullet liability cashflow

Hedge Notional €m



50yr bullet liability cashflow

Hedge Notional €m



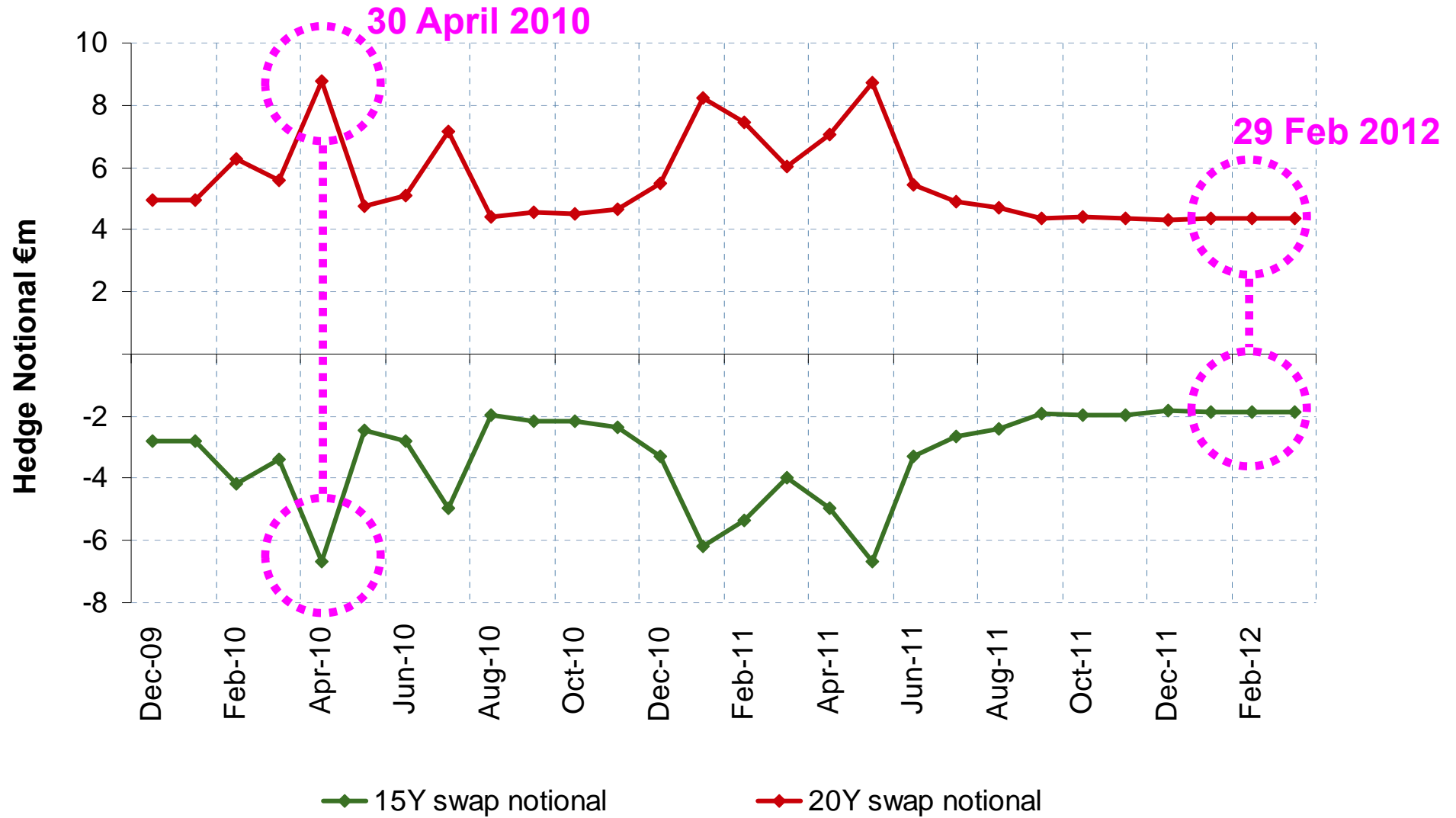
Material drop-off in sensitivity to interest rates



PV01's	Swap curve	Solvency II (20yr LLP, 10yr convergence)
Bullet liability 10yr	100%	101%
Bullet liability 20yr	100%	102%
Bullet liability 30yr	100%	66%
Bullet liability 50yr	100%	29%

Robustness of the hedge over time

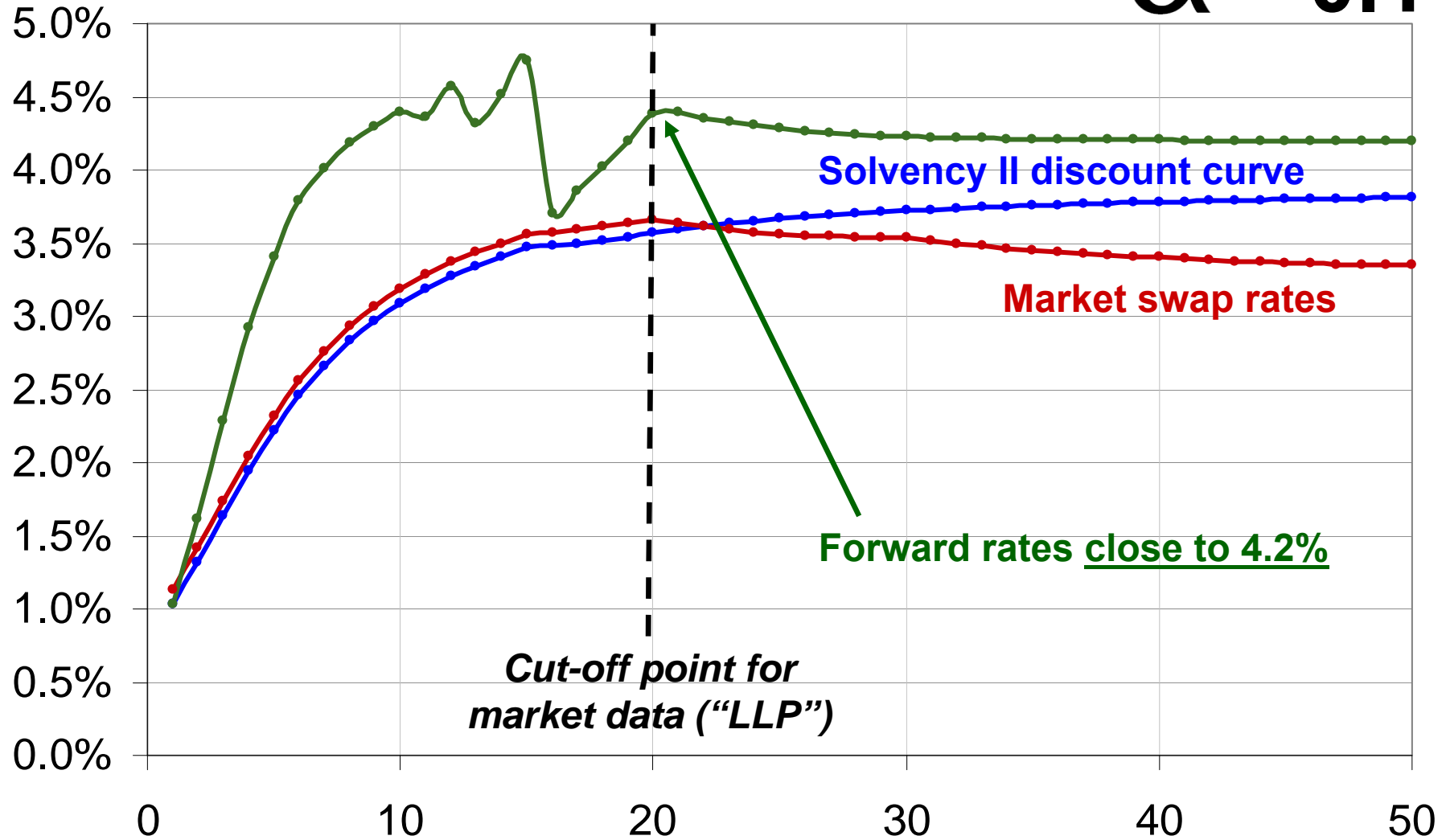
Hedge notionals – Large degree of volatility over past 2 years



30 April 2010



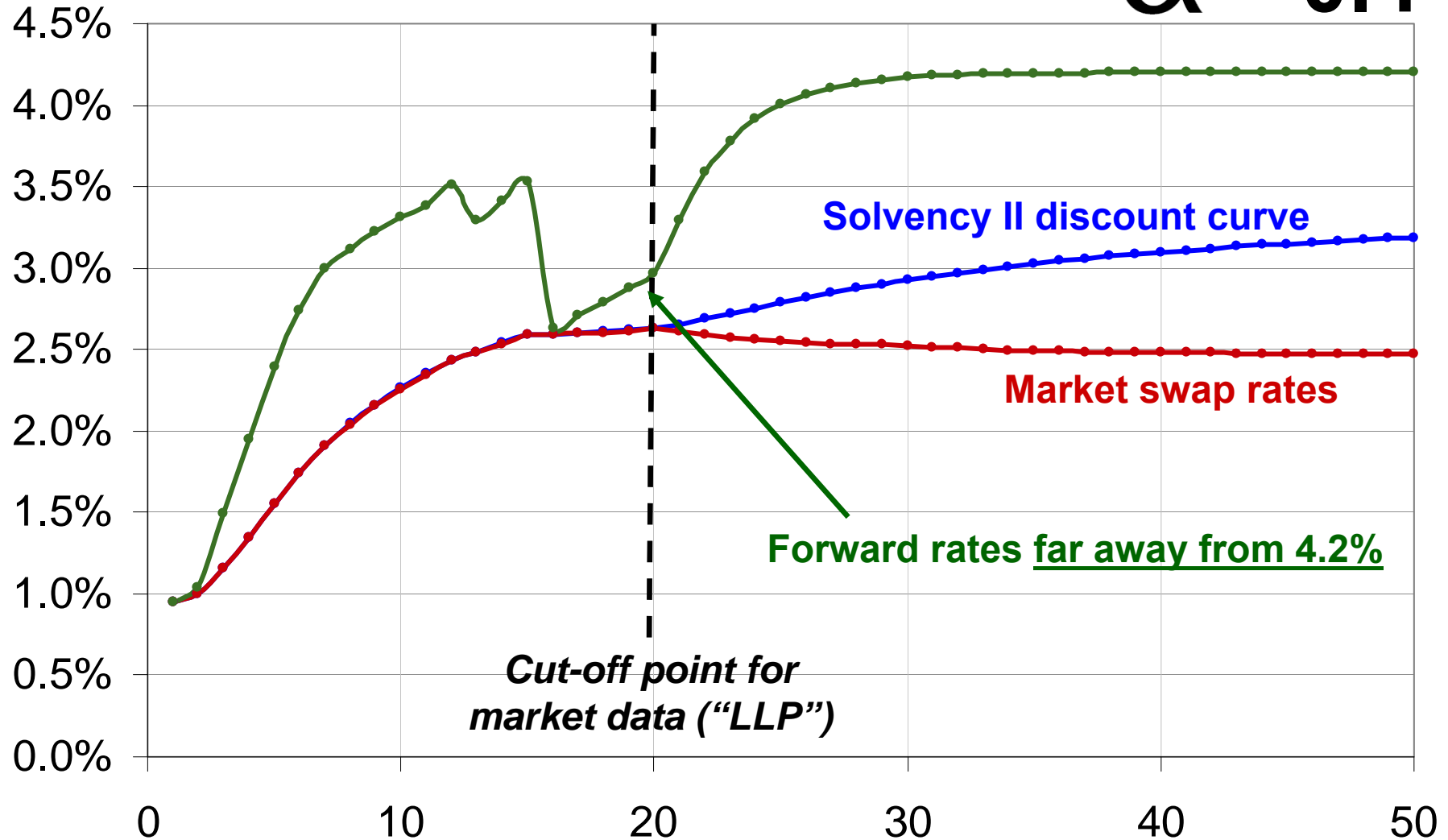
$\alpha = 0.1$



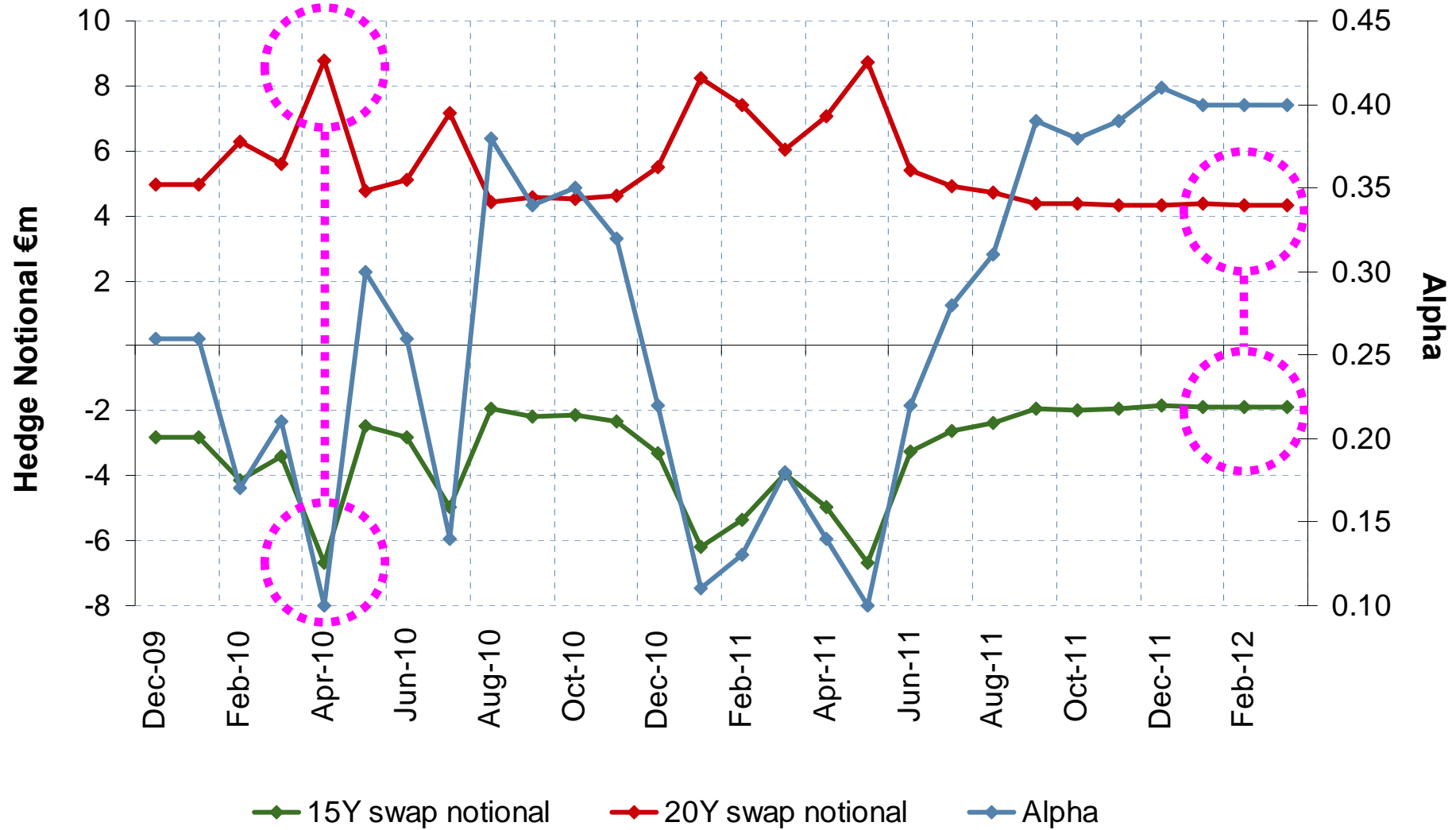
29 February 2012



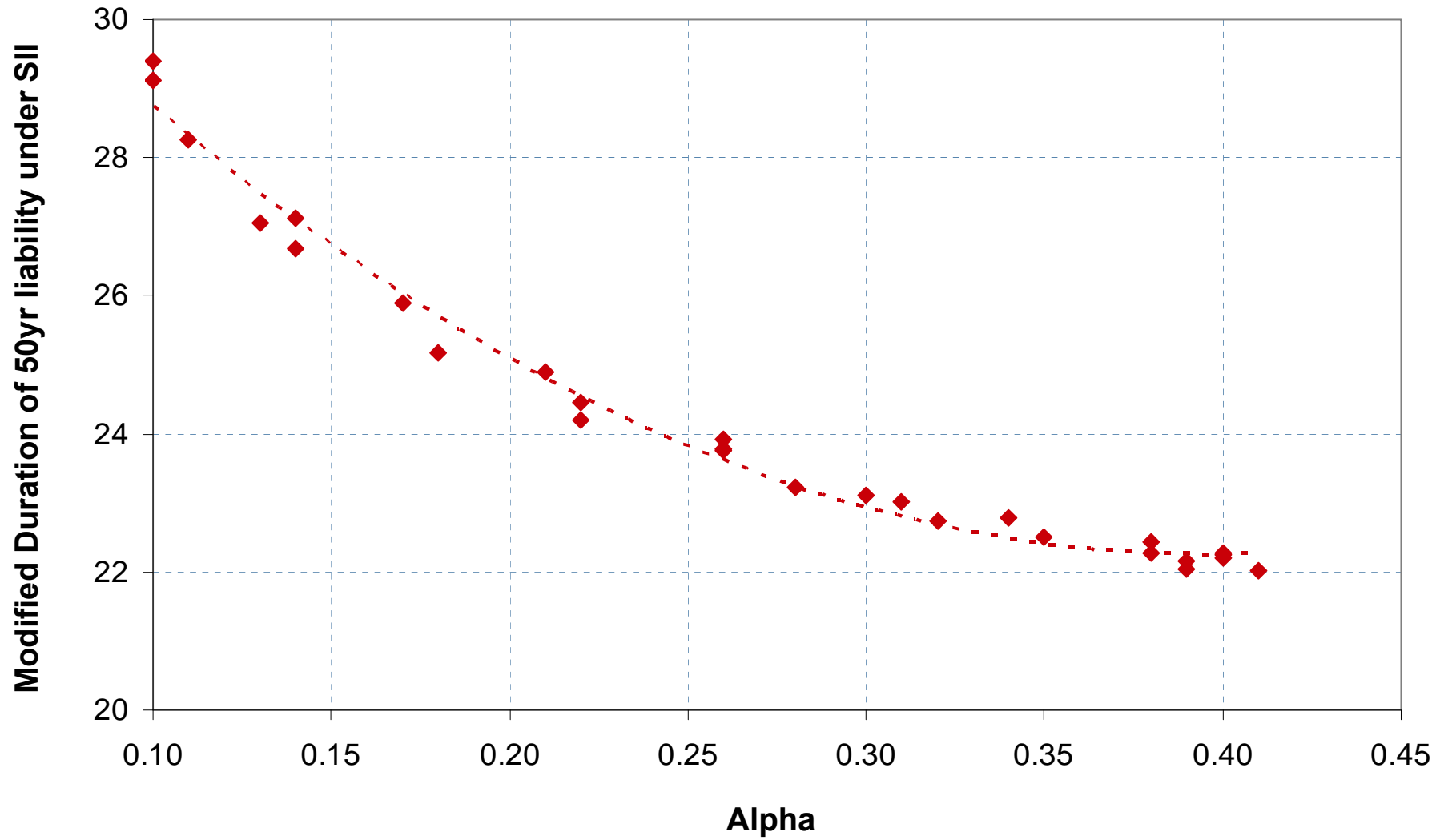
$\alpha = 0.4$



Relationship between hedge notionals and “Alpha”

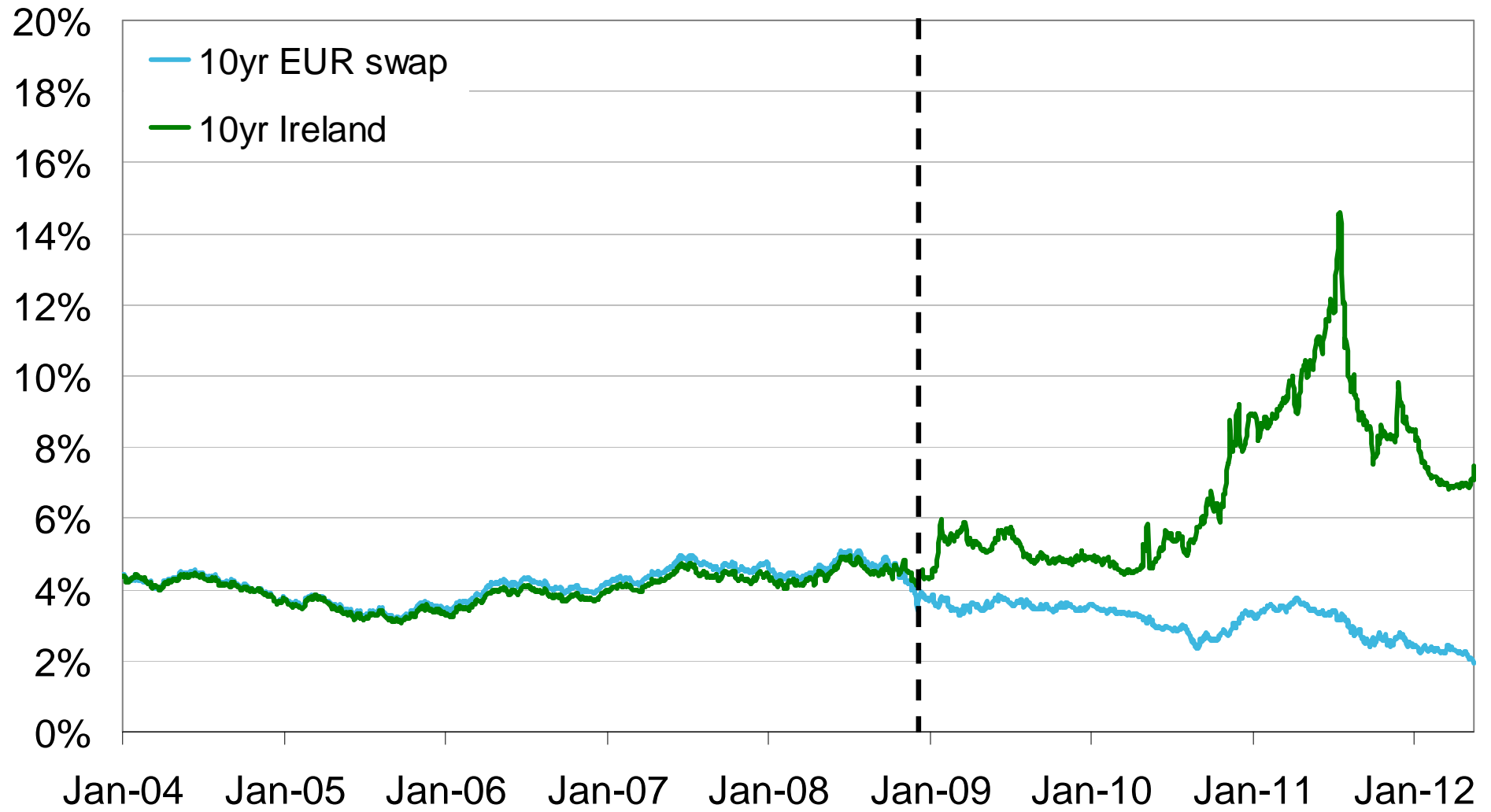


Relationship between hedge liability duration and “Alpha”

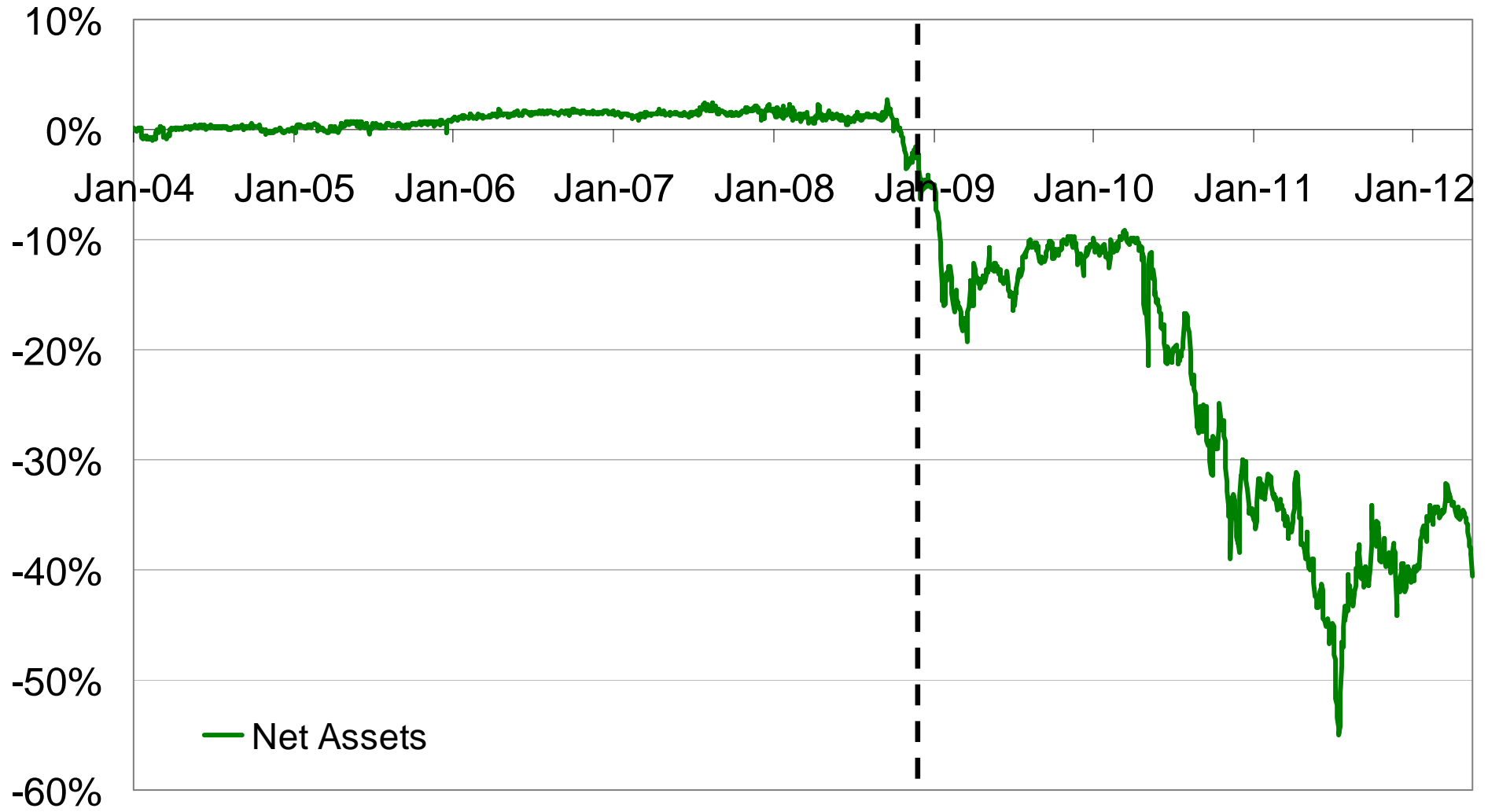


Other (practical) considerations

Yields on 10yr EU government bonds



Government bonds – Not a duration product in a swaps-based world





Other practical considerations

- How to construct an appropriate hedge portfolio
- Conflicting metrics
- Implementation
- Active management of interest rate risk?
- Central clearing (ESMA)
- Individual circumstances

Q&A

