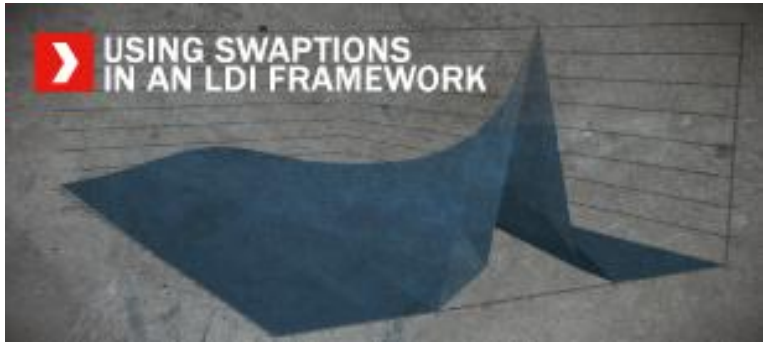
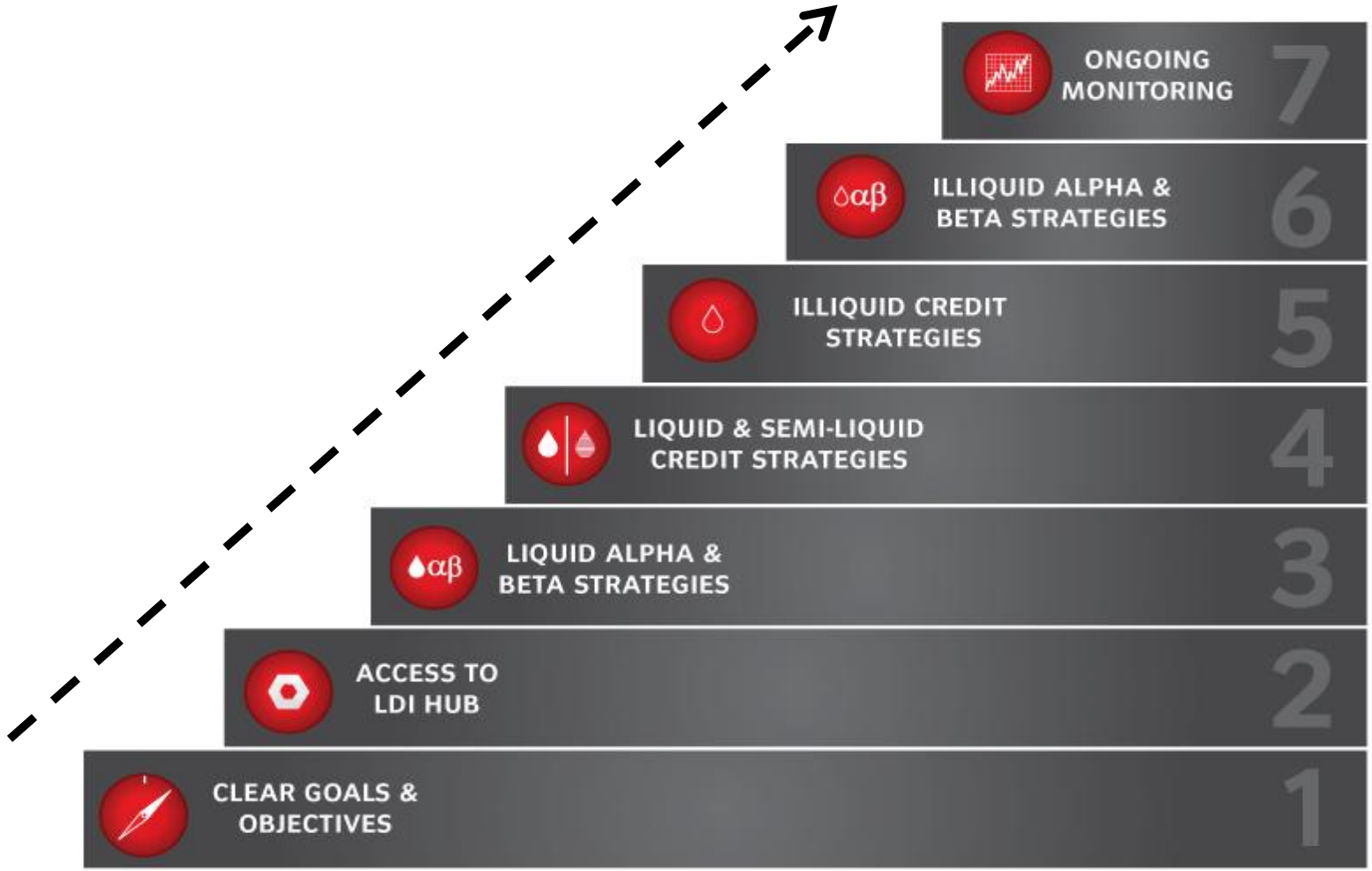


Dan Mikulskis (Redington)
Alex Soulsby (F&C)

The Seven Steps to Full Funding ™



The Fosbury Flop

Mexico 1968

Friends Provident 2003

Swaptions
Objectives of today's Teach-in

- To gain **a clear sense** of why a pension scheme might want to **use swaptions**.

- To gain a sufficient level of knowledge about the language o**f swaptions to confidently engage in discussions**.

- To have seen **examples of specific transactions that have been successfully implemented by pension funds**.

- To understand how pension schemes can **set themselves up to efficiently implement a swaptions strategy**.

Swaptions
The Key Benefits

- Swaptions can be used as an alternative to swaps for hedging some of the interest rate risk of a pension scheme

Under most scenarios you can see better outcomes

- Swaptions can also be used as an alternative to trigger levels, in order to lock into higher yields if yields were to rise

The Scheme therefore collects a premium for agreeing to enter into a swap if yields rise to a certain level

Swaptions
In detail

A Swaption is an option to enter into a swap

There are two flavours of Swaption :

Payers – an option to enter into a swap paying the fixed leg

Receivers – an option to enter into a swap receiving the fixed leg

In each case there are certain other parameters which apply :

The expiry of the option, this defines at which future point we are able to exercise the option

The term of the swap we are talking about, this need not be the same as the expiry of the option and most of the time will not be. This can be anything from 1-30 years. For a pension scheme this might typically be 20 or 30 years

The Strike. This is the fixed rate of the swap which we have the option to enter into

The Notional. This is the notional or principal value of the swap contract underlying the Swaption

Other notes

In all cases we are talking about par swaps, as opposed to the zero-coupon swaps we would normally advise clients use for hedging

Swaptions
In detail

Example (1)

A pension scheme might buy £100m notional 7y30y receiver Swaption with strike of 2.5%, for a premium of £3.5m This means:

The scheme will pay £3.5m, plus transaction costs (on day 1, the Swaption will be an asset worth £3.5m)

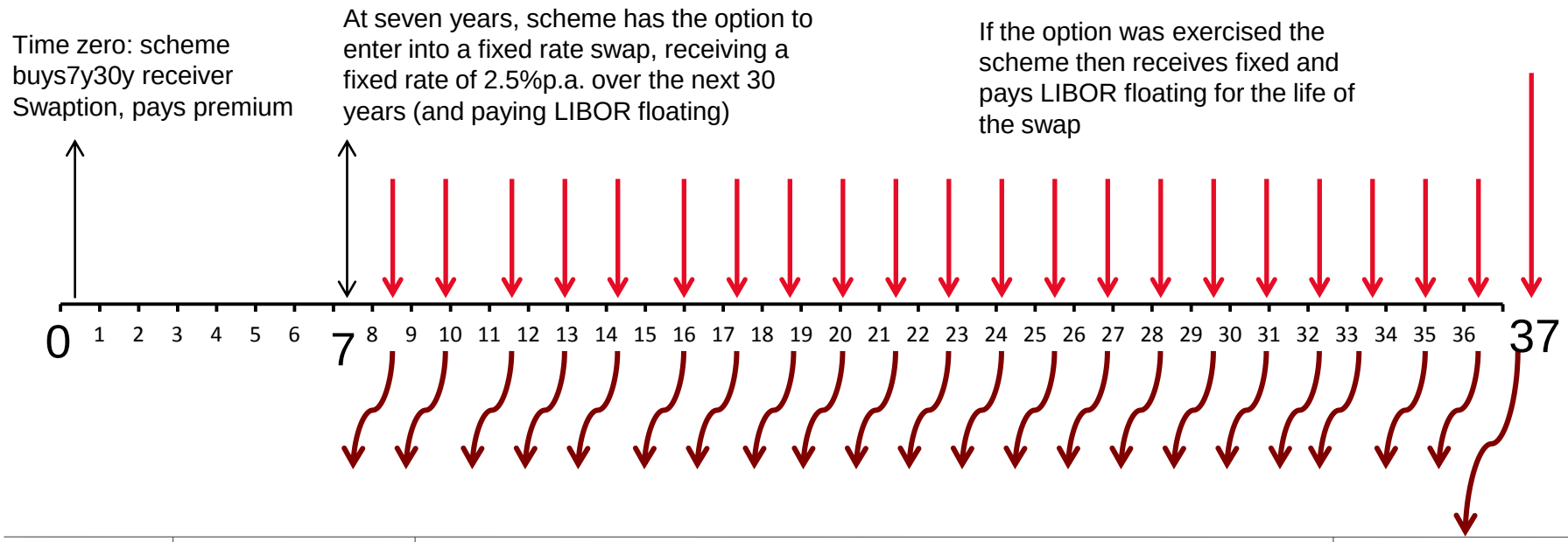
In 7 years from now

The scheme has the right (but not the obligation)

To enter into a 30 year swap on a notional of £100m

Receiving a fixed rate of 2.5%

Clearly in practice it would be profitable to exercise this only if 30yr rates were below 2.5% at the point of expiry in 7 years



Swaptions
In detail

Example (2)

A pension scheme might sell £75m notional 2y20y payer Swaption with strike of 4% for a premium of £1.4m This means:

The scheme receives premium of £1.4m, less transaction costs (on day 1, the Swaption sits as a liability of £1.4m)

In 2 years from now

The trading counterparty the scheme has sold the option to has the right (but not the obligation)

To enter into a 20 year swap with a notional of £75m with the scheme

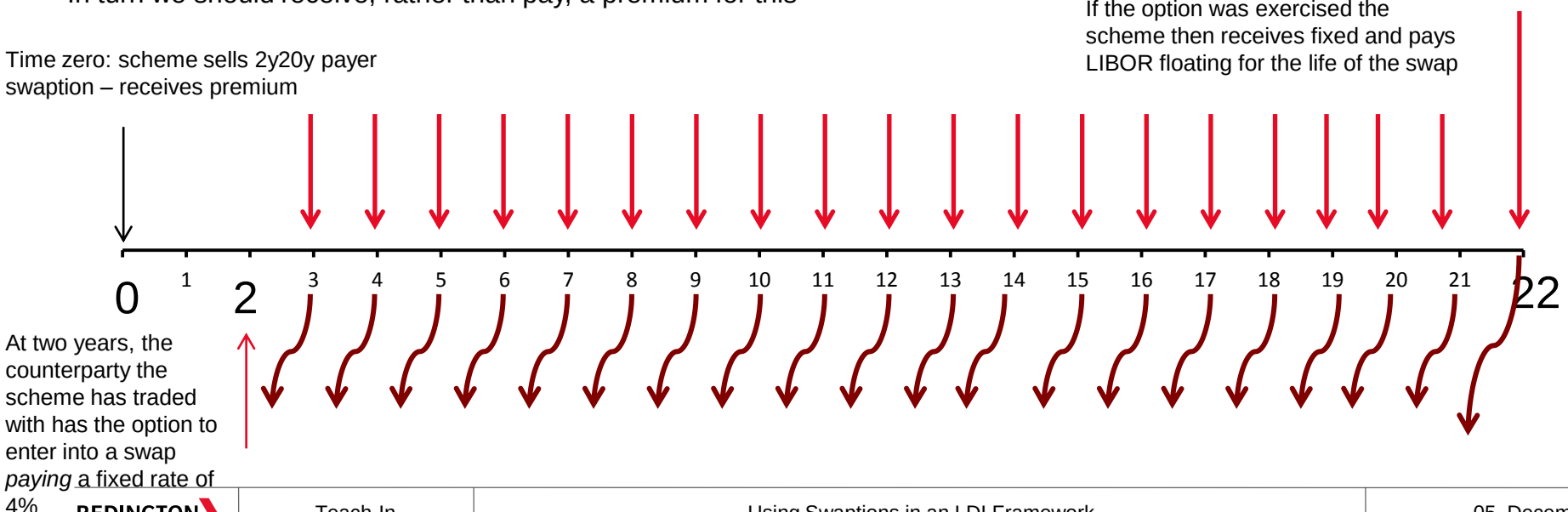
Paying a fixed rate of 4% (i.e. the scheme would receive the fixed rate of 4%)

Clearly in practice it would be profitable to exercise this only if 20yr rates were above 4% at the point of expiry in 2 years

Note the difference to the previous example, here the trading counterparty rather than the scheme has the optionality.

That is because we have sold rather than bought an option

In turn we should receive, rather than pay, a premium for this



Swaptions
Detail delta

A position in any option contract, swaptions included, introduces sensitivities to a number of factors, these are known as the Greeks.

$$\Delta \quad \Gamma \quad \sigma \quad \rho$$

The most important among these is delta – the sensitivity of the price of the option to a small move in the underlying

A fixed interest rate swap has a delta, more commonly known as the PV01

If rates are shifted by 1 basis point, the PV01 tells us by how much the value of our swap position changes

Swaptions also have a PV01 – and this is why they are useful for scheme hedging purposes

Swaptions

Receiver Swaption on the 30 year swap rate struck at 2.5%

Intuitive understanding of Swaption delta

For a swap, the PV01 will be relatively constant for small moves in rates

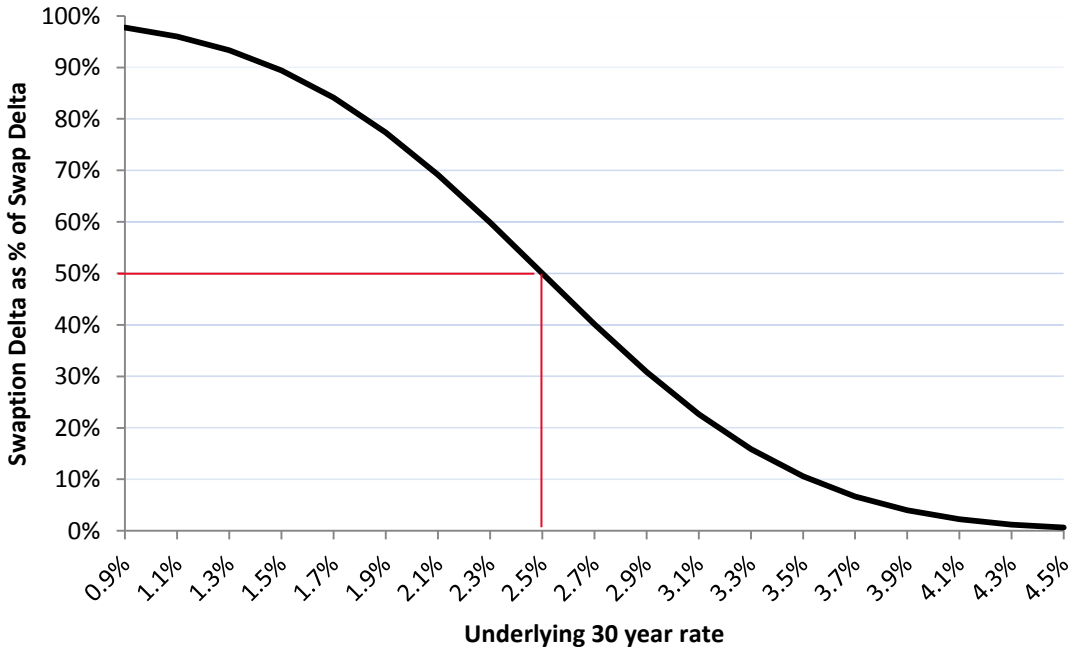
For a Swaption, the PV01 will change as rates change

An intuitive way of thinking of the Swaption PV01 is to relate it to the PV01 of the underlying swap, and think about the probability of exercise

Let us go back to the previous example of a £100m **receiver Swaption on the 30 year swap rate struck at 2.5**%

Lets say the Swaption is close to expiry now, the PV01 of the 30 year par swap is about £200k

The delta of the Swaption will vary with the underlying rate as follows



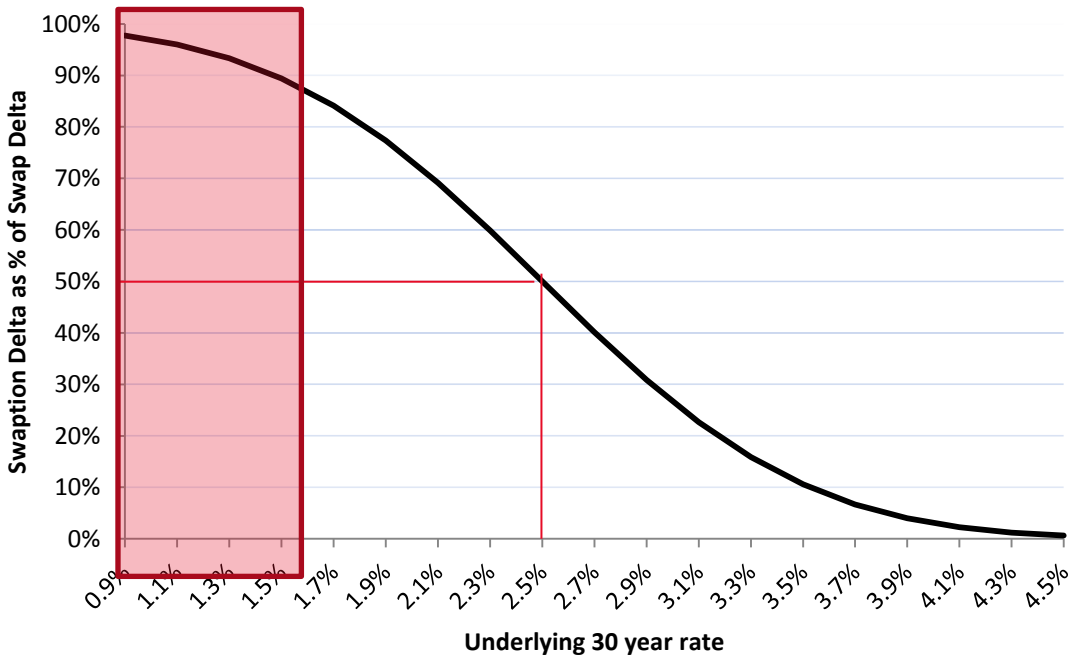
Swaptions
Detail delta

The delta of the Swaption will vary with the underlying rate

In-The-Money Swaption

The Swaption is very likely to be exercised – and become a swap

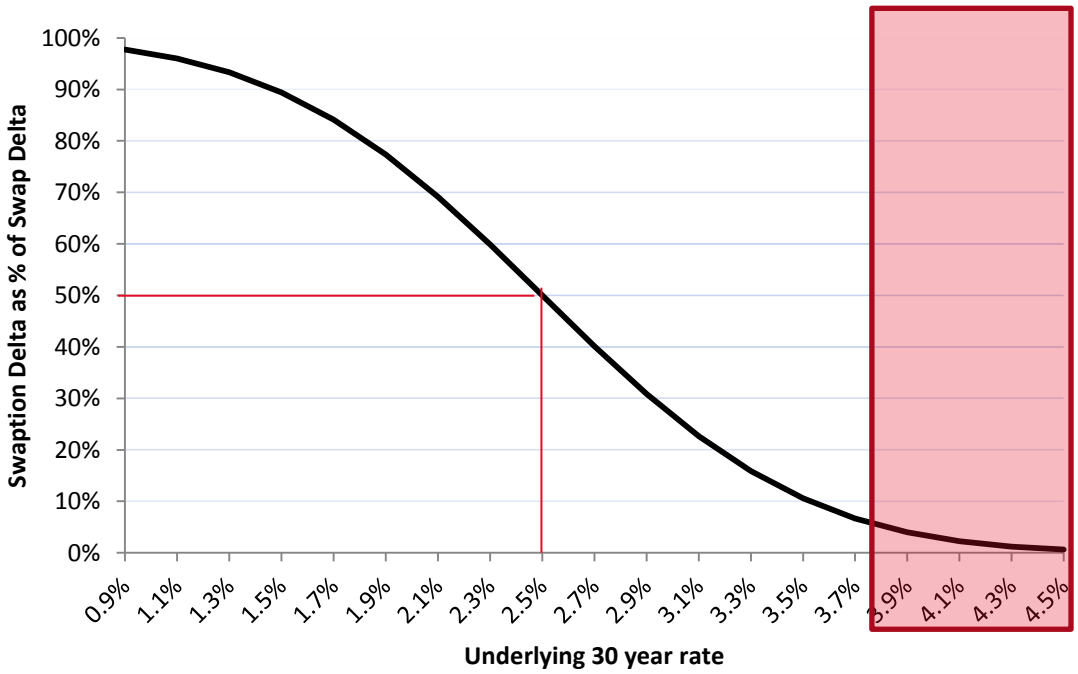
Therefore the delta “behaves like a swap”



Out-Of-The-Money Swaption

The Swaption is very unlikely to be exercised – and become a swap

Therefore the delta is close to zero

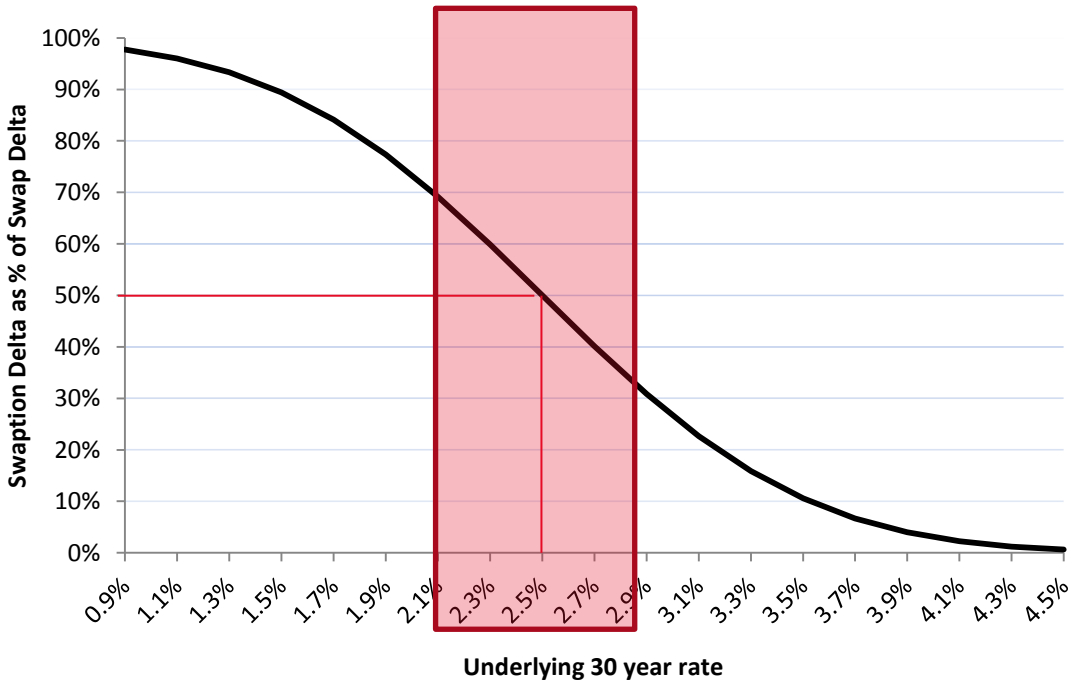


Swaptions
Detail delta

At-The-Money Swaption

The probabilities are balanced as to whether the Swaption will become a swap or not

Therefore the delta is close to 50%



Swaptions
Evaluating swaptions in an overall risk framework

The overall risk reducing properties of swaptions for a pension scheme can be evaluated in the usual way

Below examples are illustrative – actual impact will depend completely on the size of the Swaption transaction

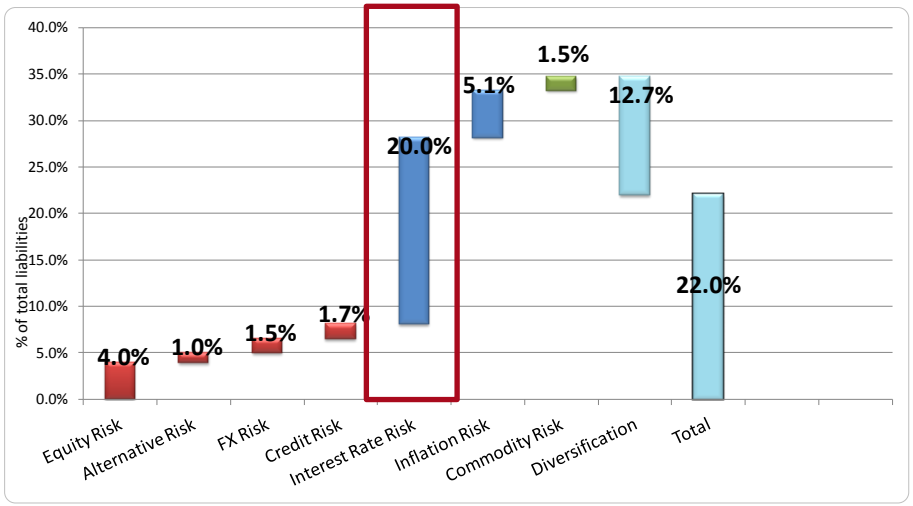
Swaption will

1. Reduce interest rate risk
2. Introduce small risk to the market price of the Swaption itself (vega risk), which is found to be diversified away – as long as Swaption position is appropriately sized

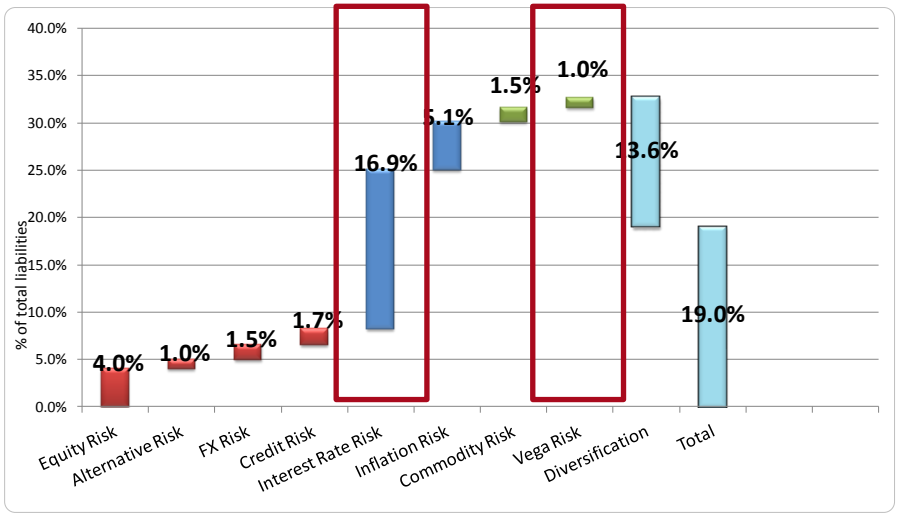
The illustration below is for a scheme with the following properties :

- Inflation hedge ratio exceeds interest rate hedge ratio
- Interest rates represent largest single risk factor

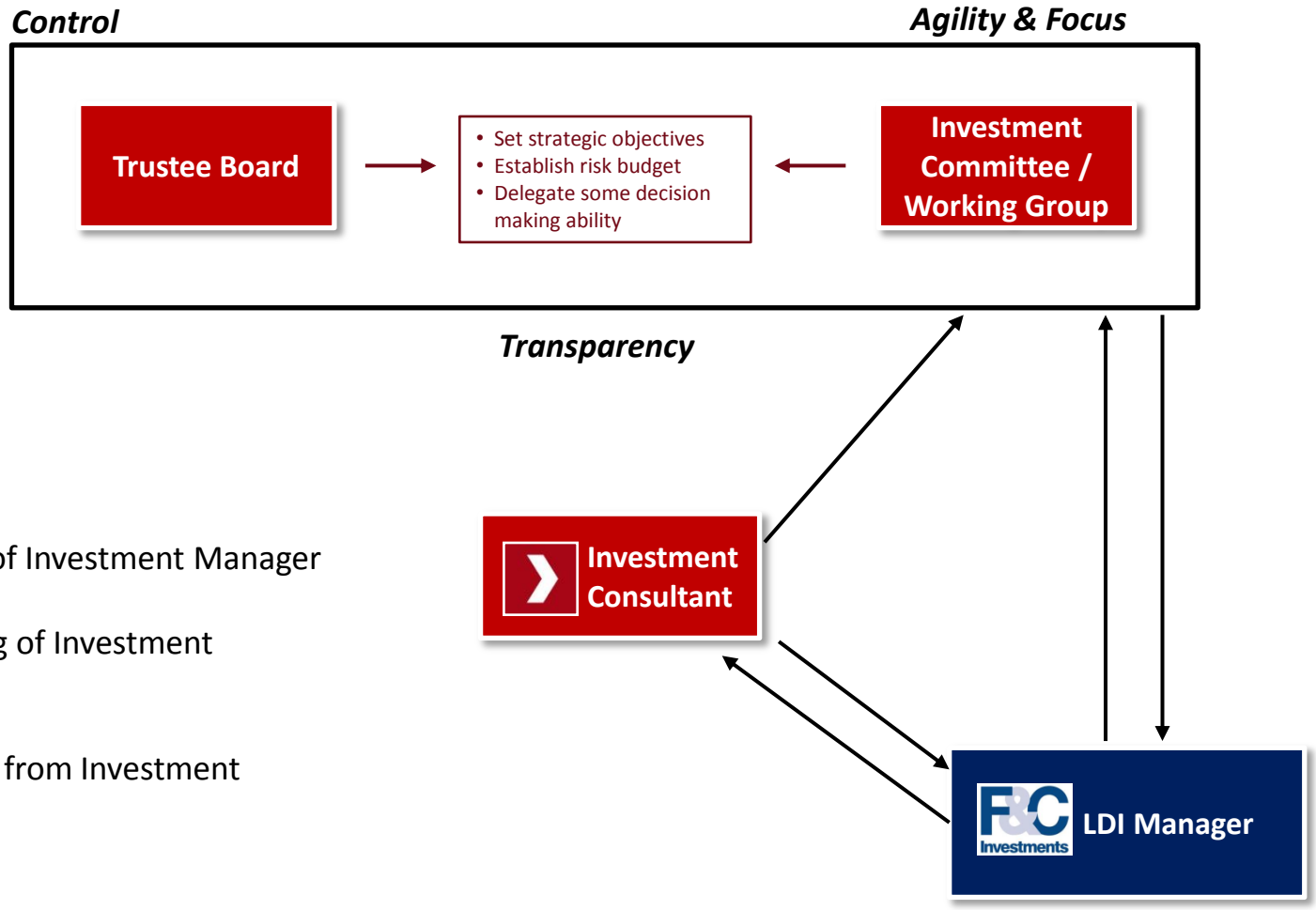
Starting point – no Swaption



With Swaption



Swaptions
Executing Swaptions Requires Efficient Governance



- Proactive involvement of Investment Manager
- Timely, focused meeting of Investment Committee
- Constructive discussion from Investment Consultant

Contacts

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